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UNITED STATES NAVAL INSTITUTE PROCEEDINGS

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UNITED STATES NAVAL INSTITUTE PROCEEDINGS

For the advancement of professional, literary and scientific knowledge in the Navy.

October, 1930

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FLIES SIXTEEN PERSONS WITH SPEED... AND LUXURIOUS COMFORT

This "S-41"—the newest of the Sikorsky line of Amphibions—provides yacht luxury with airplane speed. Her newly designed all-metal hull gives the ship exceptional handling qualities in rough water

WITHIN the last few days the first of a new series of Sikorsky Amphibions has been completed, test flown and delivered for commercial use. Fourteen passengers and a crew of two fly in the new "S-41" with the comfort that marks a private Pullman—and more than twice the speed. This newest Amphibion completes the Sikorsky line, adding a 14 passenger air yacht to a group of models which includes ships accommodating 4, 10 and 40 persons.

Based on a wealth of Sikorsky experience and research, the "S-41" embodies every feature of safety, comfort and ease of control which characterize the other Amphibions bearing the Winged "S." In this latest Sikorsky the comfort of passengers is still further enhanced with more headroom and better vision afforded by the absence of the lower wing.

Sikorsky Amphibions include the 4-place "S-39"; the 10-place "S-38"; the 16-place "S-41" and the 40-place "S-40." The "S-41" is shown above

Powered with two Pratt & Whitney "Hornet-B" engines of 575 horse-power each, the "S-41" has a high speed at sea level of 125 miles per hour. Her climb, with load, is 7500 feet in ten minutes and she has a ceiling of over 18,000 feet. The ship can fly and climb on either engine with full load.

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WORLD'S RECORDS FOR ALTITUDE WITH LOAD AND SPEED WITH LOAD

SIKORSKY AMPHIBION

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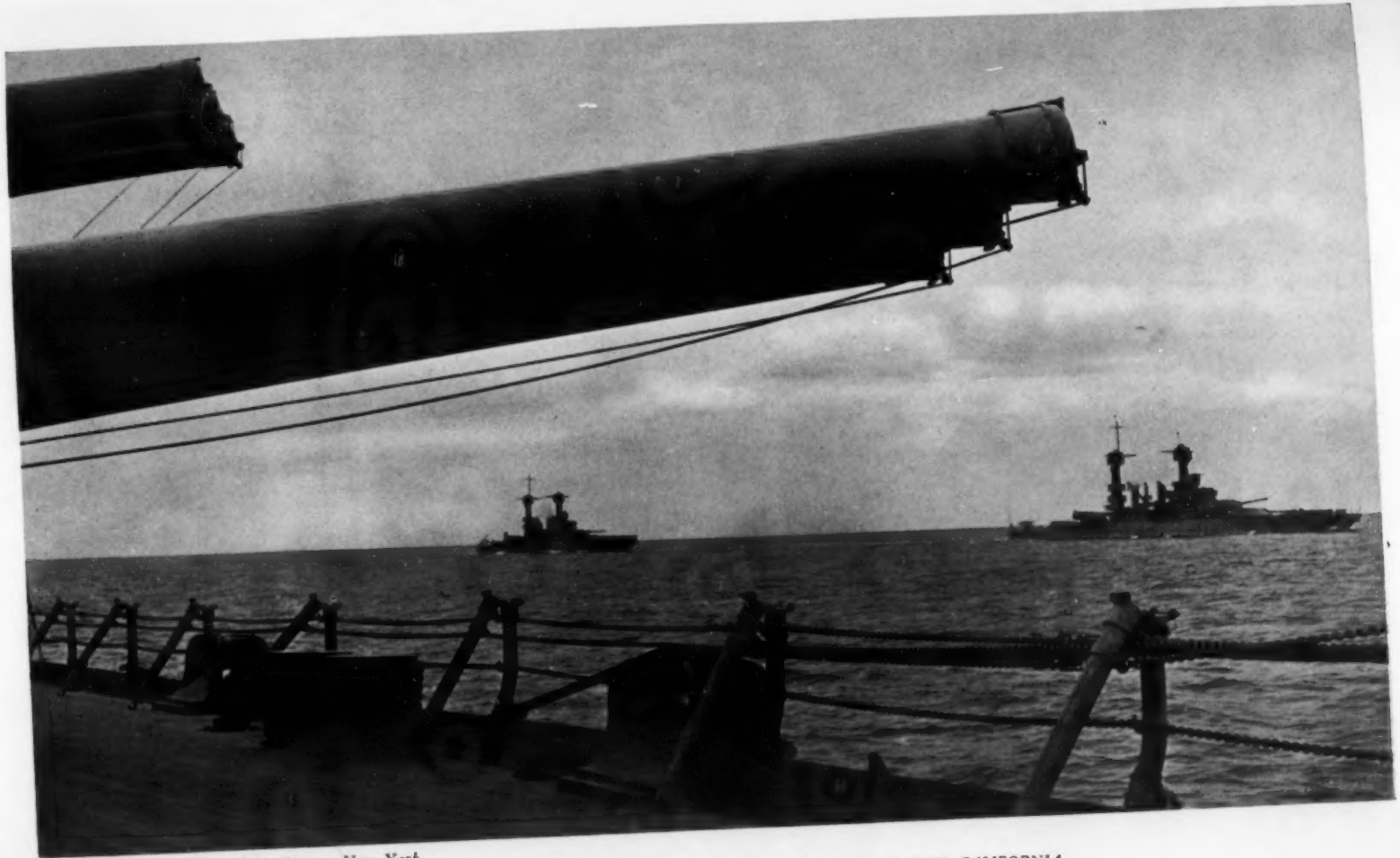

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THE *WEST VIRGINIA* AND *TENNESSEE* UNDER THE GUNS OF THE *CALIFORNIA*

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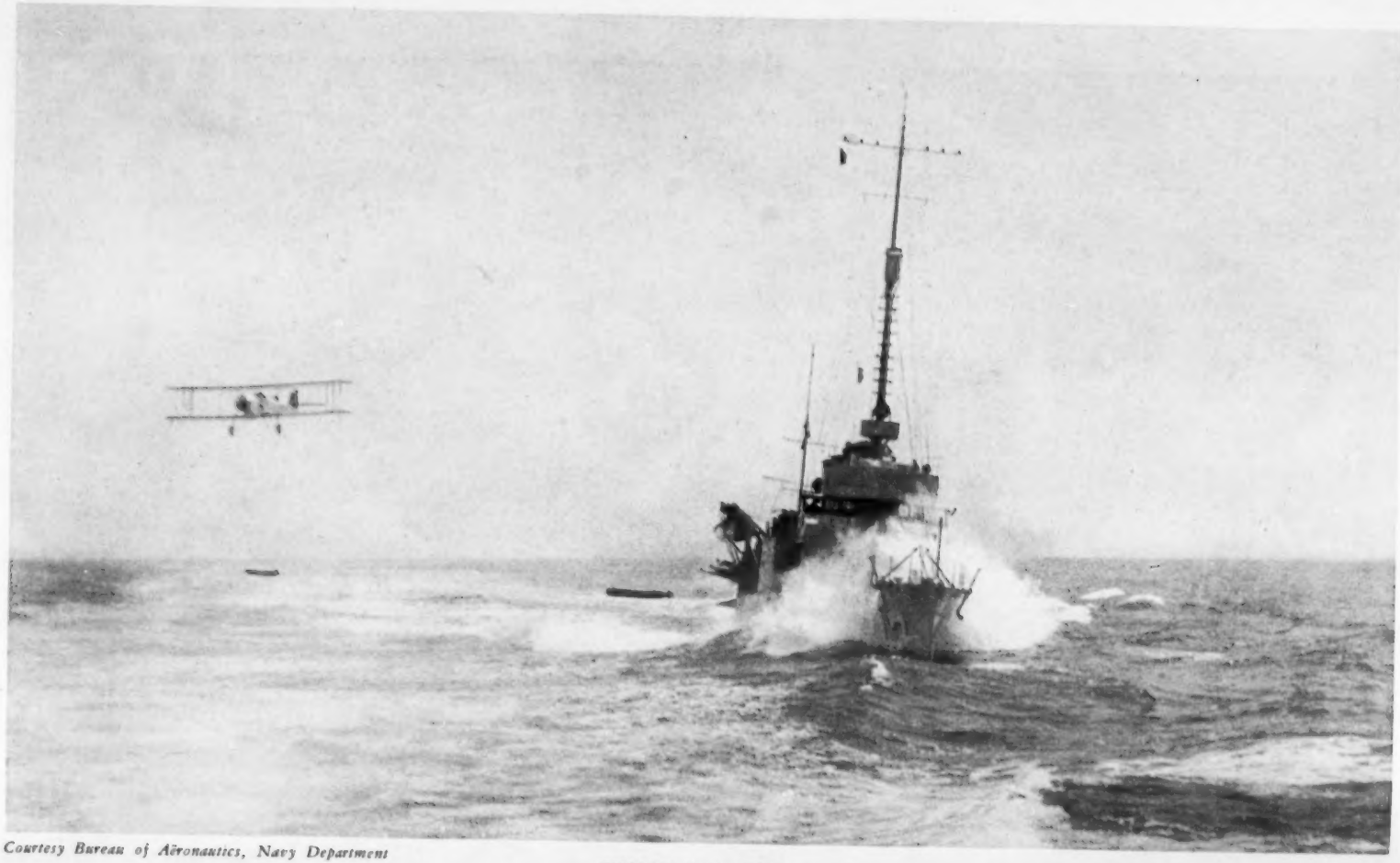

Courtesy Bureau of Aëronautics, Navy Department

CHASING TORPEDOES

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U.S.S. *PENSACOLA* DOCKING AT PENSACOLA, FLORIDA

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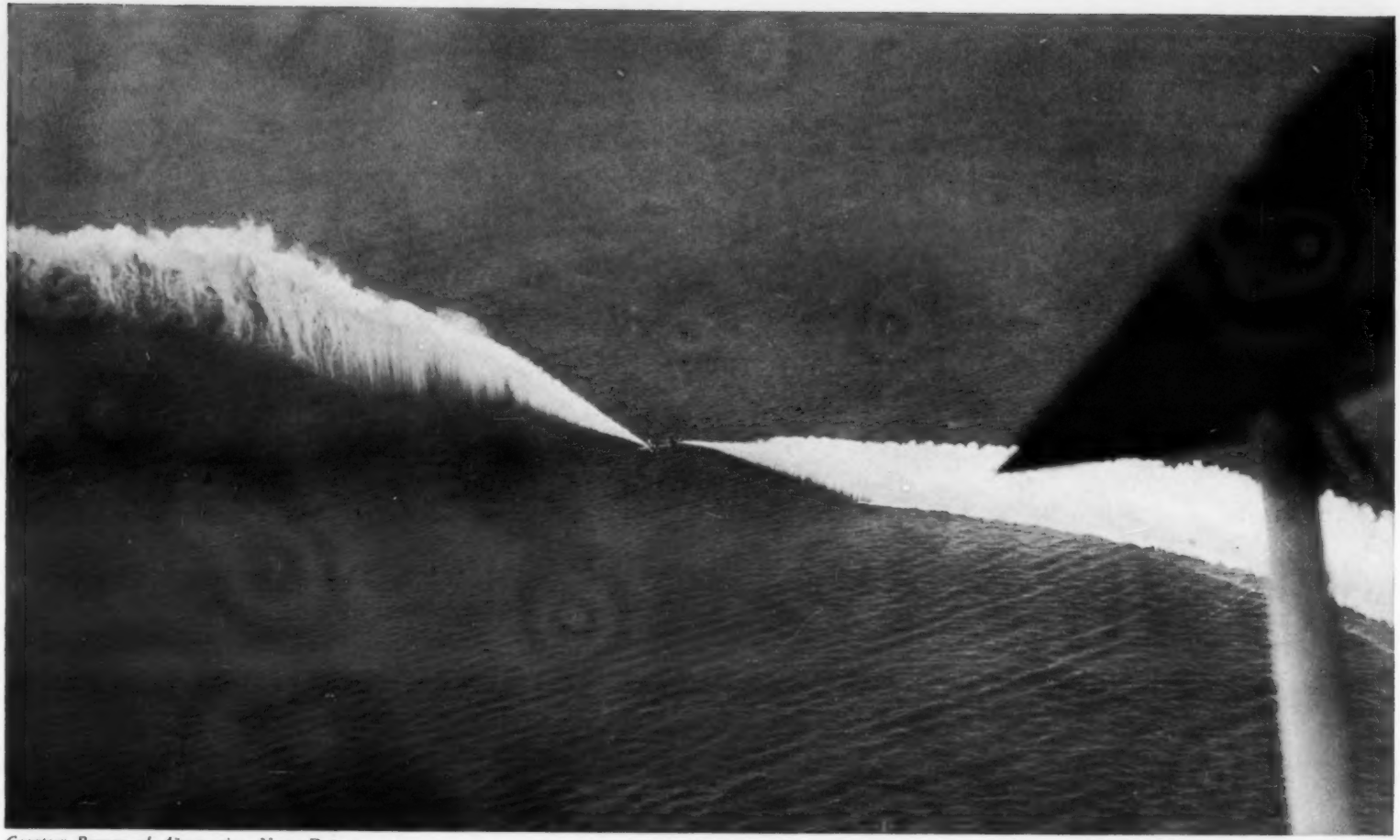

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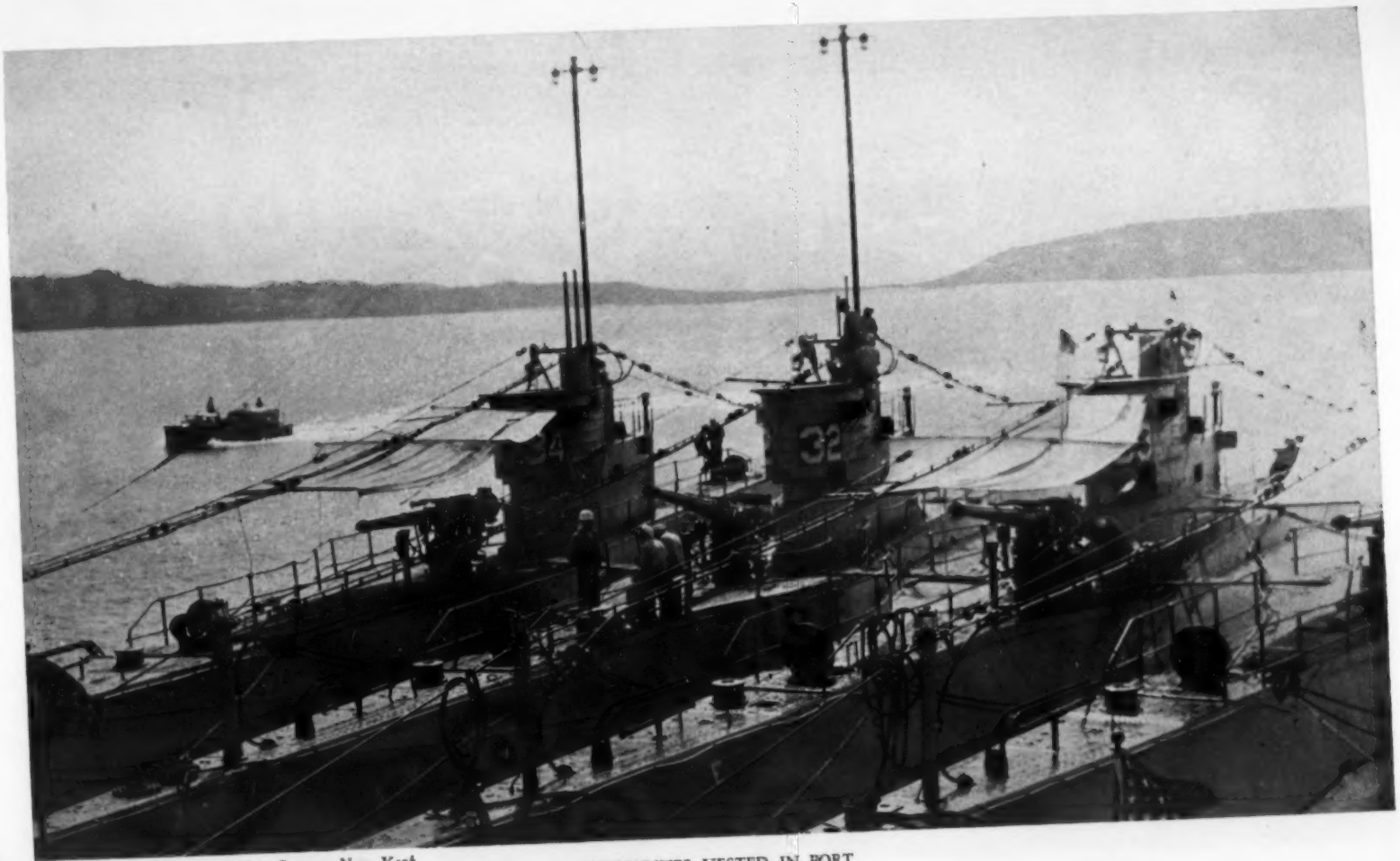
HIDING THE MOVEMENTS OF THE FLEET



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SUBMARINES NESTED IN PORT

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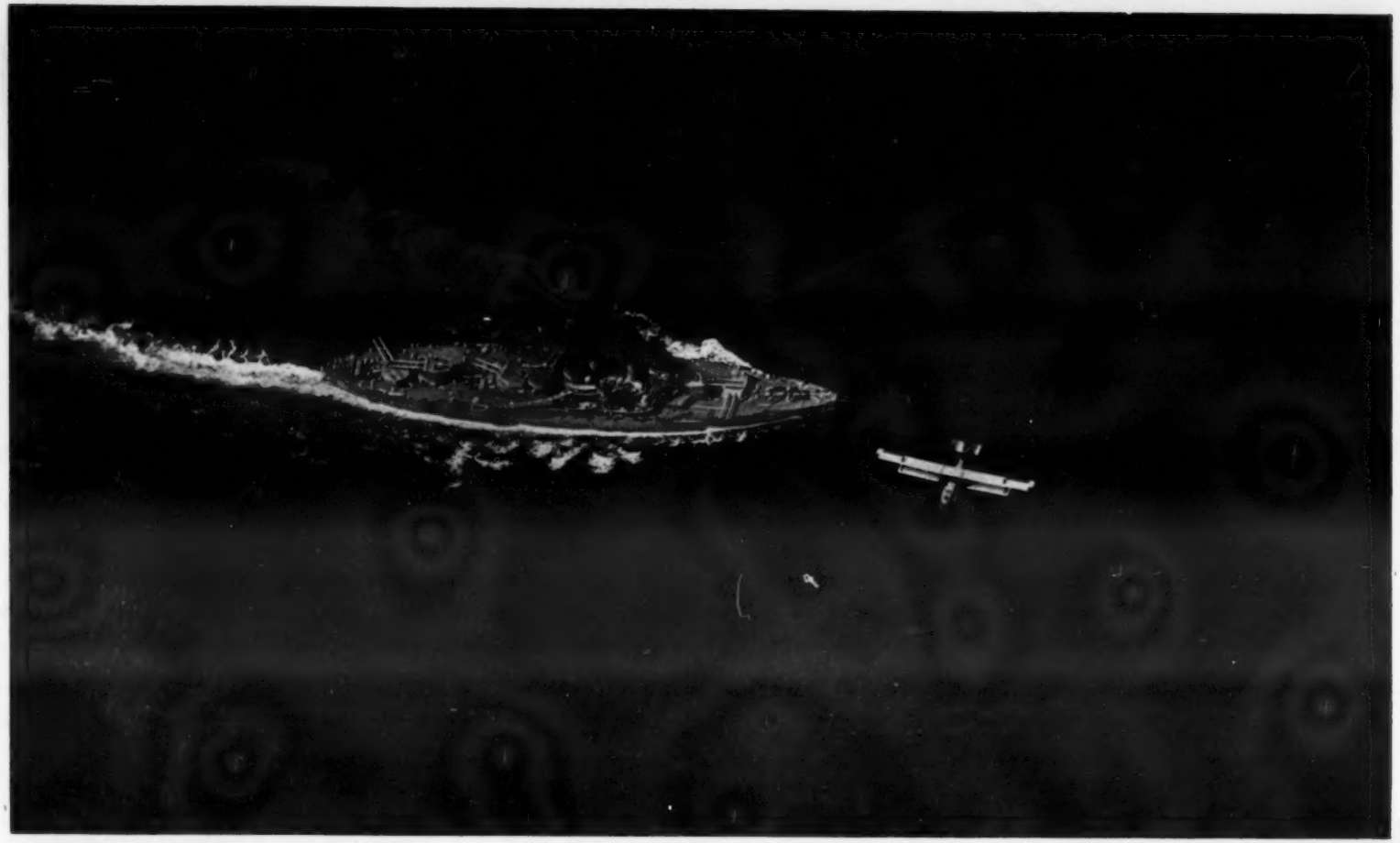

Courtesy U. S. Naval Air Station, Anacostia, D.C.

FULL SPEED

Courtesy Boeing Airplane Company

NAVY PLANES READY FOR A TAKE-OFF

Here are a number of Boeing F-2B Navy pursuit planes ready to leave the deck of an airplane carrier.

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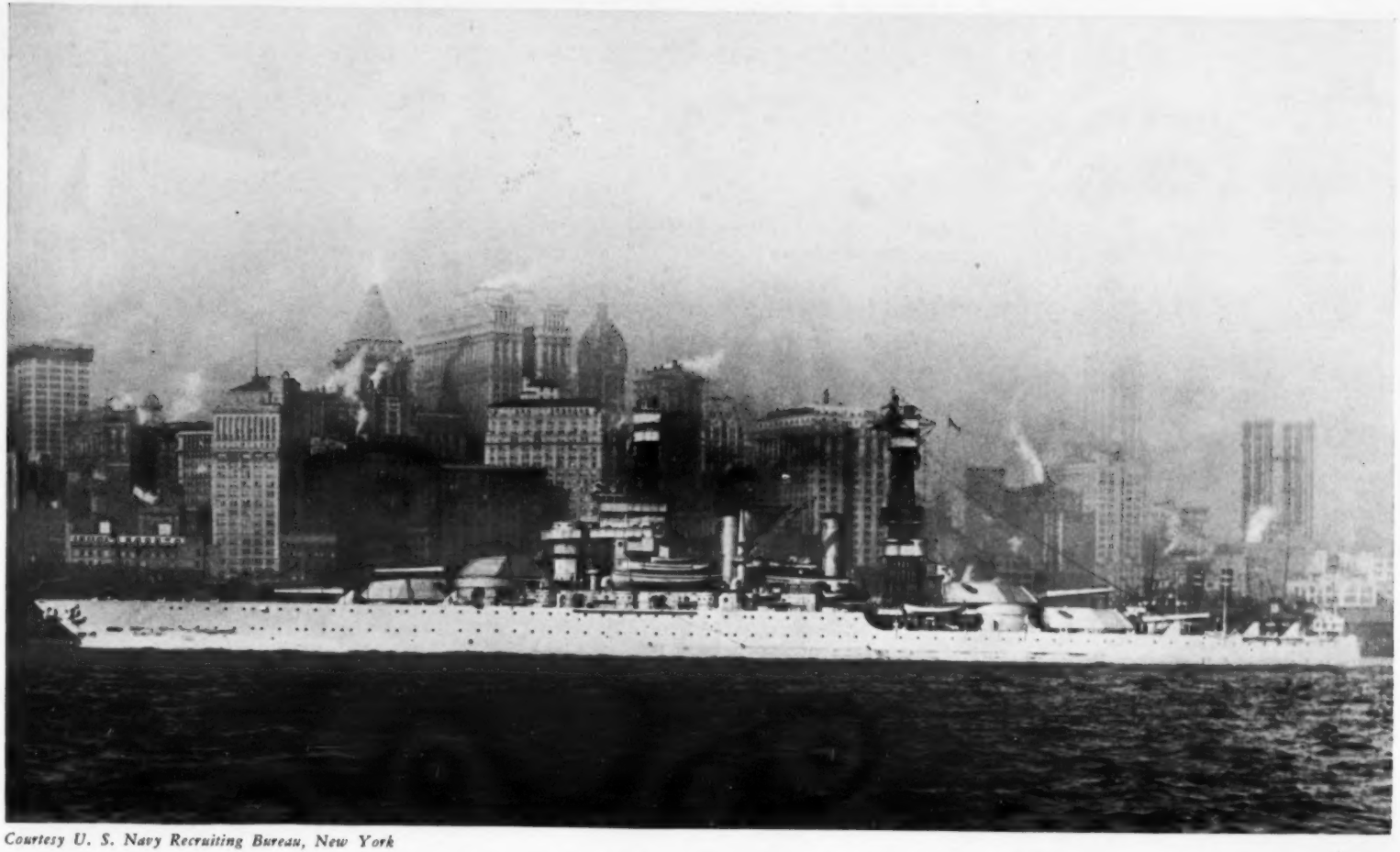

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U.S.S. *COLORADO* WITH SKY LINE OF LOWER NEW YORK AS A BACKGROUND

U.S.S. *COLORADO* WITH SKY LINE OF LOWER NEW YORK AS A BACKGROUND

THE COMMANDER IN CHIEF OF THE ARMY AND NAVY, SECRETARY OF THE NAVY ADAMS, AND ASSISTANT SECRETARY OF THE NAVY JAHNCKE

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UNITED STATES NAVAL INSTITUTE PROCEEDINGS

Vol. No. 56, No. 10 OCTOBER, 1930 *Whole No. 332*

Preface

The Naval Policy of the United States as Expressed in the Public Utterances of Our Presidents

GEORGE WASHINGTON
January 8, 1790

To be prepared for war is one of the most effectual means of preserving peace.

JOHN ADAMS
May 16, 1797

Naval power is the natural defense of the United States.

JAMES MADISON
December 5, 1815

To preserve the ships we now have in a sound state, to complete those already contemplated, to provide amply for prompt augmentations, is dictated by the soundest policy.

JAMES MONROE
January 30, 1824

Two great objects are therefore to be regarded in the establishment of an adequate naval force: The first to prevent war so far as it may be practicable; the second to diminish its calamities when it may be inevitable. No government will be disposed to violate our rights if it knows we have the means and are prepared and resolved to defend them.

JOHN QUINCY ADAMS
December 5, 1826

The gradual increase of the Navy was the principle of which the act of April 29, 1816, was the development. . . . . It was a declaration of that Congress to their constituents and to posterity that it was the destiny and the duty of the United States to become in regular process of time and by no petty advances a great naval power.

ANDREW JACKSON
March 4, 1837

We shall more certainly preserve peace when it is well understood that we are prepared for war.

JOHN TYLER
December 7, 1841

I would most earnestly recommend the increase and prompt equipment of that gallant Navy which has lighted up every sea with its victories and spread an imperishable glory over the country.

U. S. GRANT
December 2, 1872

With an energetic, progressive, business people like ours, penetrating and forming business relations with every part of the known world, a Navy strong enough to command the respect of our flag abroad is necessary for the full protection of all their rights.

CHESTER A. ARTHUR
December 6, 1881

Nothing can be more inconsistent with true public economy than withholding the means necessary to accomplish the objects intrusted by the Constitution to the National Legislature. One of these objects, which is of paramount importance, is declared by our fundamental law to be the provision for the "common defense." Surely nothing is more essential to the defense of the United States and of all our people than the efficiency of our Navy.

GROVER CLEVELAND
December 8, 1885

The nation that cannot resist aggression is constantly exposed to it. Its foreign policy is of necessity weak, and its negotiations are conducted with disadvantage because it is not in condition to enforce the terms dictated by its sense of right and justice.

WILLIAM McKINLEY
December 5, 1897

The Navy has maintained the spirit and high efficiency which have always characterized that service, and has lost none of the gallantry in heroic action which has signalized its brilliant and glorious past. The Nation has equal pride in its early and later achievements. Its habitual readiness for every emergency has won the confidence and admiration of the country. The people are interested in the continued preparation and prestige of the Navy and will justify liberal appropriations for its maintenance and improvement.

THEODORE ROOSEVELT
December 3, 1901

The work of upbuilding the Navy must be steadily continued.

December 2, 1902

There should be no halt in the work of building up the Navy, providing every year additional fighting craft. We are a very rich country, vast in extent of territory and great in population; a country, moreover, which has an Army diminutive indeed when compared with that of any other first-class power. We have deliberately made our own certain foreign policies which demand the possession of a first-class Navy. . . . . A good Navy is not a provocative of war. It is the surest guaranty of peace.

December 7, 1903

I heartily congratulate the Congress upon the steady progress in building up the American Navy. We cannot afford a let-up in this great work. To stand still means to go back. There should be no cessation in adding to the effective units of the fighting strength of the fleet.

December 4, 1904

The strong arm of the government in enforcing respect for its just rights in international matters is the Navy of the United States. I most earnestly recommend that there be no halt in the work of upbuilding the American Navy. There is no more patriotic duty before us as a people than to keep the Navy adequate to the needs of this country's position.

December 3, 1906

The United States Navy is the surest guarantor of peace which this country possesses. It is earnestly to be wished that we would profit by the teachings of history in this matter.

April 14, 1908

I advocate that the United States build a Navy commensurate with its powers and its needs, because I feel that such a Navy will be the surest guaranty and safeguard of peace.

WILLIAM HOWARD TAFT

March 4, 1909

My distinguished predecessor has in many speeches and messages set out with great force and striking language the necessity for maintaining a strong Navy commensurate with the coast line, the governmental resources, and the foreign trade of our Nation; and I wish to reiterate all the reasons which he has presented in favor of the policy of maintaining a strong Navy as the best conservator of our peace with other nations and the best means of securing respect for the assertion of our rights, the defense of our interests, and the exercise of our influence in international matters.

WARREN GAMALIEL HARDING

July 23, 1923

. . . . It is covenanted in international honor that our Navy shall retain that first rank, and any failure at retention must be charged to ourselves, because the world has deliberately acknowledged the righteousness of our first-rank position.

I make this reference because the Navy is our first line of defense. It is the armed shield bearer upon which we depend to ward off the war which we mean in our hearts never to provoke.

CALVIN COOLIDGE

December 6, 1923

Any future treaty of limitation will call on us for more ships. We should enter on no competition. We should refrain from no needful program.

November 11, 1928

All human experience seems to demonstrate that a country which makes reasonable preparation for defense is less likely to be subject to a hostile attack and less likely to suffer a violation of its rights which might lead to war. This is the prevailing attitude of the United States and one which I believe should constantly determine its actions. . . . . It is our duty to ourselves and to the cause of civilization, to the preservation of domestic tranquility, to our orderly and lawful relations with foreign people to maintain an adequate Army and Navy.

HERBERT HOOVER

September 10, 1923*

An efficient Navy would be necessary, even though we had no problems of national defense.

The arms conference, through international coöperation, has enabled us to reduce the volume of defense equipment we need at sea; we cannot reduce its strength below the limits to which we can carry such agreement with others but in any circumstances we will always need an efficient Navy for the maintenance of order upon the seas.

November 11, 1929

I have no faith in the reduction of armaments by example alone.

* Mr. Hoover was at this time Secretary of Commerce.

Our Navy *and* Our Nation

By CHARLES FRANCIS ADAMS, *Secretary of the Navy*

OUR Navy is a power and an influence in our national life and character as well as an active and potential force available in the service of the executive government.

It is the silent assistant which aids diplomacy in the establishment and maintenance of peaceful economic and international relations, and which exerts pressure in furtherance of national policy. It stands as the outer bulwark of defense when the normal safeguards of diplomacy and international good will avail no longer to hold in check or bring into concord conflicting national objectives; or it becomes the spearhead of strategic advance abroad should the defense of national policies and rights require such action.

Moreover, our people should find it reassuring that the ratios of strength established by the limitation treaties, if carefully and mutually maintained, are in themselves guarantees that the home waters and lands of the signatory powers can be held secure against invasion except in the unlikely event of an unfriendly coalition of powers. The ratios make it extremely difficult to impose national will upon other signatories and comparatively easy to defend against opposing imposition—a condition which makes for peace and security and presages success in future negotiations.

This Navy of ours is an organization of men and material of which the human element is by far the more important. To the casual observer the fleet at anchor or maneuvering at sea is a magnificent symbol of power, national honor, and dignity; but after a visit in which the mental and physical activities, the responsibilities and traditional attitude of the personnel reveal themselves, the visitor begins to see in the Navy a vital national force.

Edward Everett Hale's story, *The Man Without a Country,* pictures vividly that love of country and faith in her destiny which resides deep within us all. By detaching the central figure of the story from all contact with his country, Hale showed those qualities in the abstract, stripped of all material considerations and of all the acts and relations of daily life which in so many cases obscure deeper feeling and create the impression that the finer sentiments do not exist at all. The close of the story leaves one wishing that "The Man" had been restored to his country in time to reveal to his countrymen in purest form, as the author succeeded in doing, those intangible things which are the hope and promise of national uprightness and high character. It is well for us to remember that through force of circumstances and character of service our Navy personnel is placed to some extent in a similar detached relation to the people of our country and that in them we may hope to find most clearly exemplified the qualities which Hale extols.

To realize to the fullest extent the influence of the Navy as a factor in inspiring national discipline and virtue through association and example, it is necessary to bring the Navy into closer contact with the body politic, where the effect of training, of character building, and of enlightenment through study and foreign contacts may become a helpful and leavening ingredient. In addition the more enlightened, especially the older, heads in the naval service have a definite and responsible privilege in the interpretation and elucidation of foreign policy. Aside from the officials of the State and Commerce Departments and of members of Congress who specially interest themselves in such matters there is no group of men in our country as interested in or competent to discuss foreign policy and relations as the officer group of the naval service. On the other hand a grave responsibility goes with this privilege: that is to insure that correct interpretations are made and

that the presentation of questions and conclusions on naval policy are in exact accord with accepted national policy. Our officers must never forget that they have assumed new obligations when they entered the service of their country and that when any branch of the government having a right to control the Navy has expressed a national policy it becomes the duty of every officer to support that policy.

Our people should realize that, though a necessary mode of living and circumstances of service have an appreciable tendency to make naval personnel conservative, reticent, and diffident in their relations with civilians, a free exchange of social amenities, thoughts, and ideas is a thing of great mutual value. To this end it is hoped they will always keep the personal, social, and public "gangways and landing places" open to our seagoing personnel when on "leave or shore duty."

The system of progressive education and training as now conceived and in effect in the Navy, though its full benefit will not be felt until a further period of years must elapse, has no superior anywhere. From apprentice seaman to admiral the system is available to develop and train all who are worthy and qualified for a further step. It is a system which assures not only technical proficiency but also physical fitness, and broad enlightenment leading to good citizenship.

As to the maintenance of our Navy, the country may rest assured that within the limitations agreed to in treaties and established by executive and legislational decree, the Navy will be "second to none." The administrative organization is such that activities and ideas which are obsolescent and offices which are inadequate through development of new ideas, are revised and recreated as appears necessary. The Navy is keen to keep its material and technical equipment up to date and to attain the peak of fitness in command and operational organization and training and in administrative service. And the people of our country, in taking the Navy close to heart and mind, may well feel that they are furthering the security of the country and the perpetuation of American ideals and civilization.

Naval Contributions *to* Industry

By THE HONORABLE ERNEST LEE JAHNCKE
The Assistant Secretary of the Navy

THE relationship between our Navy and American industry is a close and intimate one. For the Navy itself is but a vast industrial establishment upon which is superimposed the purely military, nautical, and human elements. In its material aspects, therefore, the Navy is entirely a product of industry; in its functions it is the guardian of seaborne commerce which is the child of industry. Our highly mechanized fleet in its inception, growth, and perfection parallels the evolution and development of the American industrial system. It is difficult, if not impossible, to disassociate the history of one from that of the other. As an instance of this last statement, when we look back over the past half century we find that the steel industry and the steel Navy were twin brothers born of the same act in 1882. In that year when Congress provided for the construction of new warships, it wisely stipulated that they were to be built of steel of domestic manufacture. Until that time steel castings and forgings of the size required for these vessels could not be manufactured in this country. Thus the money appropriated was largely utilized in building the steel mills and in developing the processes for the high-grade steel so necessary in the manufacture of armor and armament. That year marked the turning point in the history of American steel manufacturing and the aid lent by the government at the instance of the Navy's pressing demands greatly accelerated the growth of America's basic industry.

It would be incorrect, however, to state that American industry throughout the years has consistently kept pace with naval development. On the contrary the Navy has more often been in the position of an immense floating laboratory in which thorough experimentation has usually preceded practical application or the demand upon American industrial establishments. When we listen to the well-selected radio programs in our homes today we are apt to consider this marvel as a product of the last decade. And so it is in its perfected form.

But as early as 1907, during the voyage of the fleet around the world, music was broadcasted by radio for the first time. Radio operators on board the battleships—by placing phonographs in front of their microphones—were able to broadcast to other vessels in their squadron, to commercial ships at sea, and to shore stations.

Similarly many other devices and instruments were tested out and in many instances found practical application in the Navy long before they reached the stage of development that warranted commercial exploitation. The "slow" motion picture was originally devised by the Navy for studying the motions of projectiles in flight. But perhaps the most striking single contribution by the Navy in recent years has been in the introduction of the new forms of ship propulsion.

At the turn of the century the reciprocating engine was the prime mover used in power-propelled vessels. Since that time the Navy has experimented with and has adapted successfully for the use of merchant vessels as well as men-of-war the direct-connected turbine; its successor, the geared turbine; the Diesel engine; the Diesel electric; and finally the steam electric drive—an installation now found aboard all of our recent capital ships.

What this vast marine laboratory has meant to the industrial life of the nation may be faintly recognized when we recall that for the past twenty years the Navy has been using electrically operated pumps, ventilating fans, and other auxiliaries which until very recently were unknown aboard merchant vessels; and when we realize, moreover, what is due to the patient research on board our naval vessels that has given to the nation's industrial establishment authoritative

data on questions as diverse as the possible economies of superheated steam and the lighter alloys for airplane construction. In fact the commercial field has profited equally with the military in the Navy's manifold research and experimental activities. The first model basin for testing ship models and the first wind tunnel for aëronautical research to be established in this country were built by the Navy. This basin does experimental work for the shipbuilding industry. Naval experiments in connection with the corrosion and fatigue of metals and along other lines of metallurgy have done much to alter previous conceptions regarding structural factors of safety. Particularly active in electrical research, the Navy has found a practical culmination in this science in the 180,000-horsepower, electric drive, power plants of the *Lexington* and *Saratoga*. The total electric power of our nine electrically driven ships would, if applied to the projection of shells shooting directly upwards, bombard the moon at the rate of six hundred tons of shells a day; or would supply the light, heat, and power needs of nine million people.

The fuel-oil testing plant at the Philadelphia Navy Yard, which has carried on extensive experiments in the scientific combustion of fuel oil and in the use of pulverized coal, is responsible for improvements in power plants both ashore and afloat. The manuals prepared by the technical bureaus of the Navy Department, for the operation, care, repair, and upkeep of naval ships and machinery have become standard guides for naval architects and engineers and for instructional purposes at technical schools.

Whatever branch of the naval establishment, whatever phase of naval activity we direct our attention to, there always do we find our first line of defense in the van of industrial progress. In coöperation with the Army, the Navy has forwarded the development of aviation to the point where it has become a practical means of transportation. Those who today are traveling in comfort and safety over the ever expanding network of airways owe a great debt to the pioneer aviators of the Army and Navy, who gave their lives to the conquest of a new element.

Most of our people are familiar with the Naval Communication service as an organization which in coöperation with the Naval Observatory furnishes us daily with time signals by which the nation sets its clocks and chronometers.

Most of our citizens know too that it is the Naval Communication service which efficiently operates the radio-compass stations that dot our seaboard and are a boon to every hard-pressed mariner who during fog or thick weather draws near the American coast line. But these functions, important as they may be, constitute by no means the only work of Naval Communications. It is the established policy of the Navy Department to *coöperate* with the American radio and cable organizations, in *safeguarding* the public and private communication interests of the United States, for it recognizes that communications is the handmaiden of commerce. When the cable was the only means of rapid overseas communication the United States had a meager stake in control of the world cable net. Realizing that radio would eventually provide a new means for international communications, naval officers strongly urged the formation of American-owned commercial radio companies which would secure for the United States leadership in this new communication field. These same officers have played an important part at the international radio telegraphic conferences in formulating regulations for the control of radio and for the elimination of interference and are furnishing technical advice to the Federal Radio Commission which licenses commercial radio stations throughout the country.

It is impossible to refer to the contributions of the Naval Communication service without making mention of those of its associated activity, the Hydrographic Office. The supply of hydrographic information and marine assistance is a historic function of the Navy. Working in conjunction—these two branches of the naval establishment, one collecting and evaluating, the other disseminating—there is little doubt but that both more than pay their way in peace time as well as in the days of conflict. The activities of the Hydrographic Office are so varied that it would be difficult to even enumerate them within the limited scope of this paper. This office bears a relationship to mariners somewhat analogous to that of the American Automobile Association to motorists. Its *Sailing Directions* are to the seaman what "bluebooks" are to the motorists. Daily and weekly, in the form of

memoranda and bulletins it distributes warnings of dangers to navigation, such as icebergs, derelicts, etc. Not alone the mariner but the aviator also is the direct beneficiary of the research and tabulation work of the Hydrographic Office. Much of the activity of that office is now devoted to the safety of aviation by preparing charts and compiling navigational information solely for the use of aviators. Notable progress is being made in static research which involves the application of radio to aërological conditions. Instruments are being developed to forecast and register atmospheric conditions. These can be set up at suitable points in the West Indies and along the Atlantic Coast and it is expected that they will prove valuable to the safety of life at sea and to aviation by locating and following the paths of storm centers.

In the sonic depth finder, the Naval Research Laboratory at Bellevue, Md., has developed an instrument for measuring ocean depths with great speed and accuracy. This instrument has been installed on a number of naval vessels, and is being used not only to promote the safety of navigation but also for making surveys of the ocean floor which will be of immense value to submarine cable companies.

In one brief article it is not possible to even touch on all the cases wherein the Navy has proved a direct stimulus to the nation's industrial fabric. The foregoing citations merely indicate some of its many ramifications. It may be stated, however, that actually the Navy has aided industry far more by its insistence upon high standards of quality in its specifications for naval material than by any direct contribution on its part to the development of the material itself. This insistence upon high standards flows from the military necessity of having the best equipment obtainable for battle. It stimulates industrial effort and produces results which previously were regarded as unattainable by the manufacturers.

While the title of this article is "Naval Contributions to Industry" it may not be out of place here to mention the great debt owed by our Navy to American industry. Without the faith and hearty coöperation of the great industrial establishments we could never have seen the results of patient laboratory and shipboard research and experimentation made practical and multiply. Restricted by international agreement to a definite limitation in numbers of warships, we may confidently look to American ingenuity and industry to provide us with ton for ton the best in equipment in ships and in aircraft.

Courtesy Office of Naval Intelligence, Navy Department

READY TO TAKE OFF

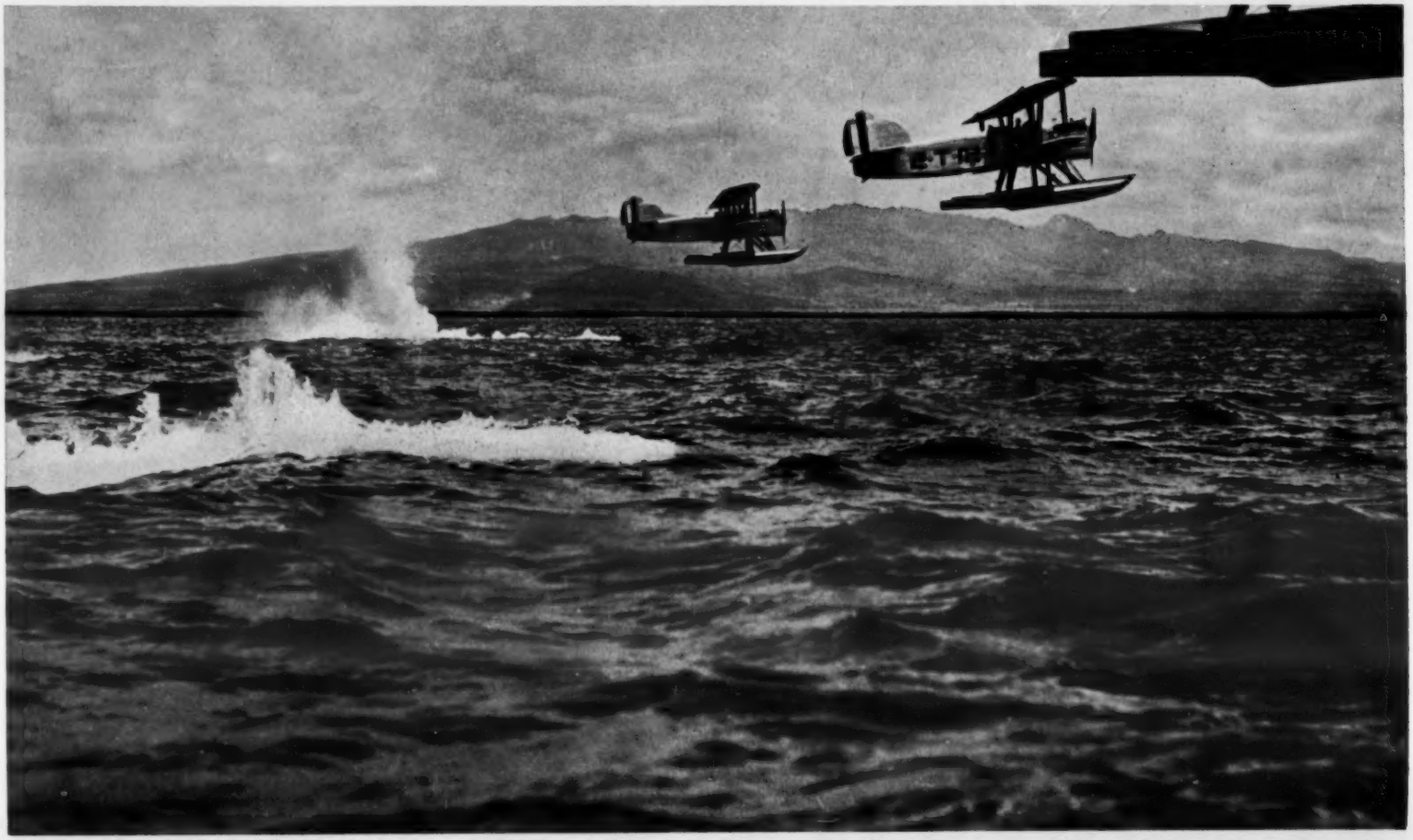
Courtesy Bureau of Aëronautics, Navy Department

PLANES OF AIR SQUADRON, BATTLE FLEET

As they flew over Lindbergh Field, San Diego, California, during dedication ceremonies.

Courtesy Bureau of Aeronautics, Navy Department

NAVY'S CURTISS HAWK XF6C-6 AIRPLANE AT THE NATIONAL AIR RACES



Courtesy Bureau of Aëronautics, Navy Department

DT PLANES DROPPING TORPEDOES AT PEARL HARBOR

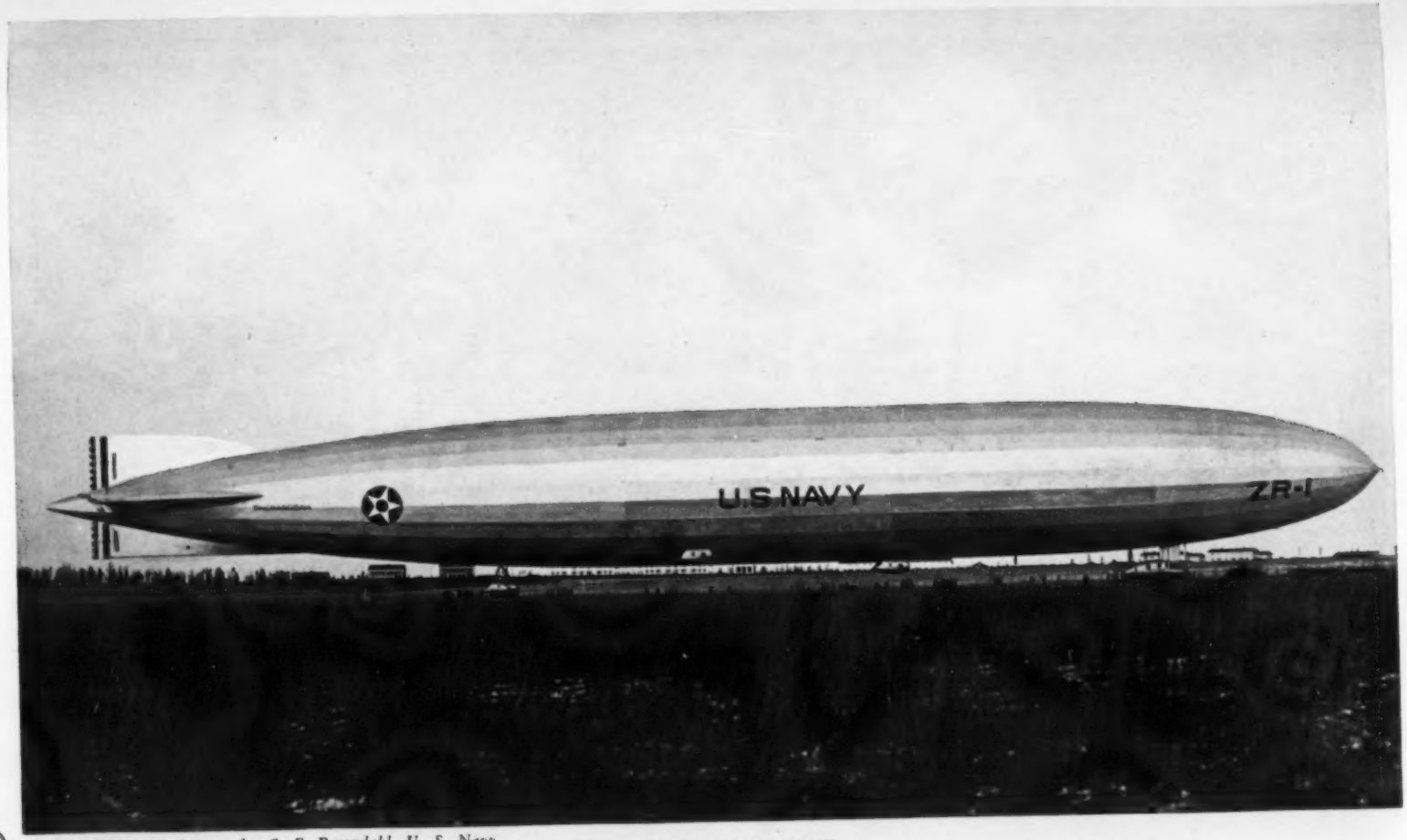
Courtesy Bureau of Aëronautics, Navy Department

INVERTED FLIGHT

UNIV. OF MICH.

Courtesy Bureau of Aëronautics, Navy Department

AFTER LEAVING THE CARRIER



Courtesy Lieutenant Commander C. E. Rosendahl, U. S. Navy

U.S.S. *SHENANDOAH*

Lessons learned from the loss of the *Shenandoah* have been invaluable in later construction and operation.

UNIV. OF MICH.

SEAPLANES ON THE WATER

Courtesy Bureau of Aeronautics, Navy Department

Naval Aviation Today *and in* Prospect

By THE HONORABLE DAVID S. INGALLS
Assistant Secretary of the Navy for Aëronautics

NAVAL aviation today is the result of a post-war incorporation of aviation into our Navy. Prior thereto there was no such thing as naval aviation as now known. Before the World War the pioneers —Towers, Ellyson, Rodgers, Billingsley, Mustin, Richardson, and others—strove with inadequate and primitive material and insufficient appropriations to awaken the Navy to the possibilities of aircraft as a part of our sea operations. To them great credit is due, not only for their persistent, courageous efforts but also for their foresight in that they laid so well the foundations for the future development of our naval aircraft operations. Their hands were responsible for initiating long before the war the catapult and carrier. Utilizing a crude arresting gear and a so-called catapult, take-offs and landings were made from the old armored cruiser *Pennsylvania.* Then, too, the cruiser *North Carolina* was fitted to carry and operate a number of seaplanes.

The entrance of the United States into the World War terminated experimental work and confined naval aviation operations primarily to the development of coastal patrol. Assigned definite tasks, the Navy expanded in personnel and material along that line to an enormous extent, while the advance of military aviation in its many other phases progressed under the land forces of the different nations.

The end of the war, therefore, found the Navy Department with only one aviation function established, and that the coastal patrol. From that time on the primary efforts of the department have been, while maintaining the continued development of coastal patrol, to properly initiate, develop, and maintain aviation in our fleets. So that today we have something over 800 planes of which more than half are on active duty at sea. In accordance with the five-year building program authorized by Congress in 1926 the Navy will have by July 1, 1931, 1,000 modern operating planes.

The active fighting forces of our naval aviation comprise four groups, and in addition thereto there exists a complete organization for the development and maintenance thereof.

The Aircraft Squadrons, Scouting Fleet, consist of one torpedo and bombing squadron attached to the tender *Wright;* one observation squadron aboard the battleships *Arkansas, Utah,* and *Florida;* three scouting squadrons attached to the light cruiser divisions; and a utility and patrol squadron also attached to the *Wright.* This is the existing developed aviation arm of our Scouting Fleet today.

The Aircraft Squadrons, Battle Fleet, consist of three observation squadrons based aboard the various battleships of the fleet; two torpedo and bombing squadrons, one attached to the *Lexington* and one to the *Saratoga;* three fighting squadrons, one attached to the *Saratoga,* one to the *Lexington,* and the other to the *Langley;* four scouting squadrons attached to the *Langley, Saratoga, Lexington,* and *Omaha,* respectively; two light bombing squadrons, one aboard the *Lexington* and the other aboard the *Saratoga;* and a patrol plane squadron aboard the tender *Aroostook.* All three aircraft carriers of our Navy, the *Langley, Lexington,* and *Saratoga* are a part of the Aircraft Squadrons, Battle Fleet.

The coastal patrol stations at Coco Solo and Pearl Harbor are the only active remnant of our war-time coastal patrol development. At these bases is carried on a continuous development of type and training of personnel for that vital function of the Navy. Here principally are based the enormous flying patrol boats and the large scouting seaplanes.

The Marine Corps' active aviation forces comprise the squadrons on duty with the

Marine Expeditionary Forces in Haiti and Nicaragua, and the bases at Quantico, Va., San Diego, Calif., and on the island of Guam.

Each single aircraft squadron and station is an independent command similar to a ship. Each fleet aircraft organization is commanded by a force commander designated as Commander, Aircraft Squadrons. All aircraft operations and planning are under his cognizance and aviation units based on combatant ships are placed directly under his command at certain periods of the year for training and for coöperative work with other squadrons.

The organization to maintain these active fighting units is of necessity appreciable. In Washington is the office of the Assistant Secretary of the Navy for Aëronautics charged with the supervision and coördination of naval aviation with other departments, and the Bureau of Aëronautics providing for the material and generally guiding the entire organization. On the outskirts of Washington at Anacostia is the flight test and experimental base to which are brought all new types of plane, engine, and instrument. At Philadelphia is located our excellent Naval Aircraft Factory, established during the war, now restricted practically to experimental production and overhaul. The training of mechanics takes place at a school at Great Lakes, Ill. The training of pilots is carried on principally at Pensacola, Fla., with primary training at Hampton Roads, San Diego, and Seattle. At Dahlgren, Va., and Newport, R.I., are respectively located the experimental ordnance and torpedo details. Reserve aviation bases are situated at Squantum, Mass., Valley Stream, N.Y., Detroit, Mich., Great Lakes, Ill., Long Beach, Calif., Seattle, Wash., and Minneapolis, Minn.

Most vital to any organization of course is the personnel. Our naval aviation officers are selected for aviation training upon a voluntary basis after at least one year's duty at sea on a cruising ship. The enlisted pilots, likewise volunteering, are selected upon a basis of efficiency after a severe process of elimination. These officers and men then, about forty per month, are sent to the Naval Air Station at Pensacola, and roughly 50 per cent of those entering finally complete the course. Throughout the course flight training and ground school work interlock in the seaplane and landplane primary instruction, flight gunnery, bombing, radio, and navigation. Thereafter again comes selection and specialization into smaller classes and training in formation flying, radio, actual spotting of gunfire, some fixed gunfire, and studies of fighting tactics. Further navigation and scouting problems are carried on. At the conclusion of the course, normally taking almost a year, the students are sent to the fleet with almost 200 flying hours to their credit. In addition thereto the ground school has thoroughly drilled them in structure and rigging, the theory of flight, engines, instruments, aviation seamanship, gunnery including an extensive range course, bombing, radio, tactics, and many kindred matters.

Naval reserve aviation exists principally at the reserve bases noted above. Ordinarily two regular or reserve officers and about eight enlisted men are assigned to permanent actual duty at each station, which normally operates four training seaplanes. The reserve students are enlisted originally as seamen second class, U. S. Naval Reserve. Ground school work is covered during the winter flight instruction, thus qualifying them to proceed to complete training at Pensacola. These stations likewise afford opportunity for the continued practice of the reservists during their actual duty and occasionally during the interim while on inactive duty.

The material of naval aviation may in a way be divided into five principal types of airplanes. These are: fighting, observation, torpedo and bombing, patrol and scouting, and training planes. Each has its definite and particular duty to perform and is so designated, designed, and constructed. Fighting planes are to gain and maintain supremacy of the air, that our ships and planes shall be not only free from the enemy's air attack but also at liberty to perform their various functions. These planes are single or two-seated planes with the utmost of performance in speed, climb, and maneuverability. They are armed with fixed guns firing forward through the propeller, timed for the projectile to pass between the propeller blades. The two-seated fighters carry in addition to the pilot a rear gunner, with two free guns.

Observation or "spotting" planes are used to control the gunfire of ships and to improve

the accuracy of this gunfire. This type of plane requires moderate altitude, good all-around vision and radio. The observation planes are handled from battleships and cruisers and are either seaplanes or amphibians capable of landing on the seas or on aircraft carriers.

Bombing and torpedo planes are used for direct attack on enemy surface craft. These planes carry either the standard service torpedo of about 2,000 pounds or the equivalent weight in bombs and also carry machine guns for their own protection against anti-aircraft. They are built inherently stable in order that the aiming of bombs or torpedoes may be accurate.

Patrol or scouting planes require endurance, and speed must be sacrificed in order to obtain this. They are equipped with long-range radio and with complete navigating equipment as they must pass out of sight of the fleet and return to same and must constantly know their position to carry out their mission. Patrol planes are long-range scouts and are usually multi-engine flying boats carrying a crew of five or six.

Training planes are dual-control planes which are built as foolproof as possible. They are used for primary training purposes only, as all advanced and specialized training is given in the standard service types of aircraft.

Outside of those based ashore, provision obviously must be made for the planes based at sea. Thus every cruiser and battleship carries its complement of planes, launched by means of the catapult, and hoisted on board again from the sea after the performance of the mission. But primarily by aircraft carriers is the aërial arm of the Navy supported. Aircraft carriers are large, fast cruisers fitted with flush upper decks enabling the aircraft to operate therefrom almost as from an ordinary land field. These decks of course are fitted with many contrivances, including the arresting gear that is essential to this difficult type of aircraft operation. Beneath this flying deck the other decks are given over to hangar space and repair shops as well as furnishing the ordinary quarters and provisions for the officers and men.

Of these aircraft carriers at present three are in existence. The oldest of these is the *Langley*, a converted collier since the year 1922. Slow and small, probably of little value in actual warfare, she has been and is an invaluable ship for experimental development. Upon her results were based the air developments incorporated in the *Saratoga* and *Lexington*. These latter were originally designed as battle cruisers, then converted in accordance with the Washington treaty into carriers. They are 888 feet long with a beam of 106 feet and can attain a speed of 33.5 knots by means of their tremendous motors of 180,000 horsepower. These great ships can each operate about eighty airplanes and are self-contained in every respect.

In addition to the operation of these three carriers the Navy Department has but recently advertised for the construction of a 10,000-ton aircraft carrier which will bring our aircraft tonnage as provided under the Washington treaty to 76,000 tons. The limit in this treaty is 135,000 tons.

So much for the airplane activities of today. But naval aviation is not complete without a word of lighter-than-air. And yet lighter-than-air has not been developed or tried to any appreciable extent as yet. In the future will lie the proof of its military value. So far we have seen only the use of small blimps in coastal patrol, as during the last war, and the rather extraordinary feats of recent date accomplished by the *Graf Zeppelin* on its world cruises.

The future of naval aviation seems today to be assured. The extraordinary progress that has been made in this arm in the last decade has already made aviation an integral part of practically every naval operation. Even if there were no further developments the full utilization of the developments made to date would dictate a continued expansion of the aërial services in the ensuing years. The necessity of increased carrier tonnage and the aircraft equipment incident thereto is obvious, and the maintenance of planes on board every cruiser and battleship to be constructed in the future is essential.

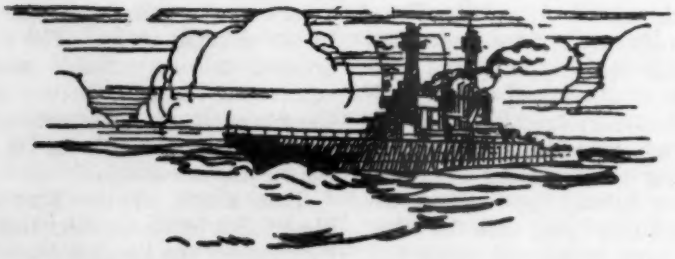
This much of the future is perfectly clear. But let us consider these possibilities: First, under the London Naval Disarmament Treaty we are entitled to construct a substantial tonnage of cruisers with landing decks thereon. To what extent this type ship may be developed is not definitely known, but advance study of the question seems to indicate that theoretically at least 75 per cent of all of the advantages of both

aircraft carrier and cruiser can be secured in one of these new warships. In view of the great possibilities of this type of vessel we can hardly doubt but that the administration and Congress will approve the development and construction of several of these ships at an early date. If the enthusiastic prognostications of the many proponents of this type of vessel are fulfilled, aviation will become an even larger and more vital part of our naval development.

The two great lighter-than-air ships that are being built by the Goodyear Company in Akron, Ohio, for the Navy, in themselves afford an important addition to naval warfare through their great scouting range and possibly their ability to drop explosives. But in addition thereto lies the fundamental feature that these great ships could become important bases for airplane activities. The design contemplates the operation while in the air from each of these ships of six airplanes. Therefore they are small aircraft carriers and as such can perform to a certain extent some of the functions of our great airplane carrier ships. In certain respects admittedly these Zeppelins are the superior of the seaborne carrier; in others equally admittedly inferior. But in any event their development and maintenance will increase the use of naval aviation in a new field.

And meanwhile something has been done and much more will be done in our efforts to utilize airplanes in connection with ships other than at present. Destroyers, submarines, and merchant ships all afford virgin ground for the development of operation of this new instrument of warfare, the airplane. To what extent we may go along these lines no one of course knows today. Then there is the important fact that aircraft themselves have not reached their final stages of development and that through some extraordinary improvement of the plane itself we may find many more and greater uses for the airplane at sea. The autogiro with its very slow landing speed, for instance, possibly even the helicopter, which if ever perfected will rise and descend vertically, may conceivably permit a greatly expanded use of such airplanes from the decks even of battleships and cruisers as they are today. Conceivable, too, is the development of enormous flying boats, capable actually of operation for days at a time over the vast expanses of the sea, able to cruise perhaps either on the sea itself or in the air above.

Thus we may look back upon the recent phenomenal development of naval aviation, making aircraft operations an integral part of our Navy. And with assured confidence we may look forward into the future to a continued development and expansion of this modern means of national defense.



Fleets: Their Composition *and* Uses

By Rear Admiral J. V. Chase, *U. S. Navy*
Commander in Chief United States Fleet

Types of Combatant Ships of the United States Fleet

THE United States Fleet has in its composition the following combatant units: battleships, aircraft carriers, light cruisers, destroyers, light mine layers, submarines. There are other types such as eagle boats, aircraft tenders, and mine sweepers, which, while they are combatant vessels, have special functions, and do not travel with the fleet when it is at sea on a purely offensive mission.

The Battleship—The battleship, or ship of the line, is the backbone of the fighting fleet. The fleet is built up around this type. The other types of ships required for the support of the battleship force are designed on the need for guarding that battleship force from surprise attack and to assist it tactically in action.

The battleship itself is the beautifully balanced fighting unit. Those responsible for originating its characteristics must carefully study the ships of foreign nations against which it may some day be pitted, they must study the tactical and strategical requirements of this type. The first characteristic developed is that of offense—gun power or power to inflict damage. Having fixed this element in her design, the remaining available weight is distributed between protection or power to withstand pounding by an enemy, and propulsion or speed and steaming radius. Before the Washington treaty limited the displacement of capital ships to 35,000 tons, it was customary in order to get protection, speed, and steaming radius, to increase the size of the ship until the requirements of these characteristics were satisfied.

The three elements—gun power, armor protection, and speed—are weighed one against the other by the designers, until the maximum of each which the ship can carry on her allowed displacement is determined. The designers then proceed with the final plans.

It may be noted here that nations build ships with characteristics to meet their particular national needs. This applies to all types of fighting craft, and not to battleships alone. As to battleships, the United States, until limited in displacement by the Washington treaty, stressed in this type the characteristics of long steaming radius and protection. The policy of the United States has always been to endeavor to gain gun power superior to that on similar types possessed by foreign nations. To obtain these characteristics, speed was somewhat sacrificed. The reasons for these characteristics in the case of the United States ships was that this country has few outlying bases to link the home country with her overseas possessions, and to reach the probable theater of operations of a war the fleet would have to steam many thousands of miles with no ports into which to go for fuel and supplies. The ships had to be constructed to withstand damage which might otherwise force them to go to a base. In the case of the British capital ships we find that when their capital ships were constructed, the most probable enemy was close to home; therefore, long steaming radius was not necessary and the weights saved here could be put into machinery for higher speeds.

The Aircraft Carrier—The primary weapon of the aircraft carrier is the airplane. By the Washington treaty the airplane carrier is limited to a gun not larger in caliber than 8-inch, and the number of such guns it is permitted to carry is fixed by treaty and varies with the displacement of the ship. In addition they carry a rather large antiaircraft battery. Generally speaking, these ships are lightly armored. They depend upon their speed, antiaircraft battery and planes for their principal protection. They are floating landing fields for aircraft. The decks and elevators have to be so designed

and arranged that planes can be rapidly brought to the flying deck and flown off, with as little interference as possible with planes returning to the deck from the air. They may be considered to be floating service stations where planes fitted with proper landing gear can land for fuel and servicing whether the planes belong to the particular carrier or not. For the same reasons as outlined under "battleship," these ships must have long steaming radius. The decks are particularly vulnerable to gunfire and to bombing from the air, and once the decks are destroyed or badly damaged, it is readily seen that the ships lose their effectiveness as carriers; in such an event, their guns and speed make them valuable to perform the duties of a light cruiser, but they are too vulnerable for really effective cruiser work. The exception to this light protection is in those carriers converted from battleships and battle cruisers, but in all probability, the future carriers will be lightly armored, if armored at all.

The Light Cruiser—The Washington treaty limited light cruisers to a standard displacement of not more than 10,000 tons, and prohibited a battery of guns of greater than 8-inch caliber. The London treaty has further divided these ships into two subcategories: (a) those carrying guns greater than 6.1 inches in caliber but not greater than 8-inch; (b) those carrying guns of 6.1-inch or less caliber. The light cruisers of the future will carry armor to furnish them reasonable protection against guns not larger than those they themselves carry. The light cruisers of the United States must have moderately high speed, speed sufficient to allow them to escape from vessels more heavily gunned than themselves, as heavy a battery as is compatible with their speed and the long steaming radius they should have to meet our needs, and with the protection they must have to face an enemy with equal or less powerful battery.

The Destroyer—The primary weapon is the torpedo, although it carries a battery of guns not to exceed 5.1-inch caliber, and sometimes carries depth charges for offense against submarines. The standard displacement is limited by the London treaty to 1,850 tons. The vessel has high speed, and having no armor protection, it must depend upon its speed for protection.

The destroyer is the evolution of the torpedo boat. The torpedo boat was predicted to be the answer to the battleship. This failed to materialize, and the destroyer was built and enlarged as the answer to the torpedo boat, which it has driven from the seas; and besides it furnishes a torpedo vessel with sufficient seaworthiness to operate with the fleet.

The Light Mine Layer—This is essentially a destroyer hull from which the torpedo tubes have been removed and in their place have been installed racks for carrying and laying mines. As with the destroyer, she carries a gun battery. Her protection lies in her speed.

The Submarine—The primary weapon of the submarine is the torpedo. Some vessels of this type carry guns for use against surface craft when the submarine is caught on the surface and cannot submerge. The submerged speed is necessarily slow, while on the surface some submarines develop a speed in the neighborhood of eighteen knots. The defense of the submarine lies in submersion.

The Eagle Boat—The eagle boat was developed as a special measure during the World War to meet the submarine menace. The vessel has a speed of about eighteen knots and no protection. They are rapidly disappearing from use and probably no more will be constructed. It is a special type designed to meet a special need.

The Aircraft Tender—These vessels are usually employed to "mother" seaplanes. They are floating repair stations and storages for this particular type of plane. They are usually sent to a base with the seaplanes where they act as quarters for the crews of the planes and as service stations for the planes themselves. They have no flying-on decks as have the carriers, but the planes have to be hoisted aboard. When a number of seaplanes are to go from one port to another, the tender usually precedes them and prepares a base for their arrival. The tenders are usually placed in sheltered waters to care for planes as above described.

The Mine Sweeper—Ships of about 1,000 tons displacement, sturdy, and with excellent sea keeping qualities. They have a speed of about fourteen knots, and in appearance resemble a large ocean-going tug. They are very lightly armed with guns only. They are fitted to sweep channels or mined areas for the purpose of clearing those areas of anchored submarine mines.

Types of Combatant Ships Not in the United States Navy

The Battle Cruiser—The battle cruiser is a capital ship with a battery equal or nearly equal in caliber to that of the battleship. The difference between this type and the battleship lies in the fact that the battle cruiser has very high speed, about thirty-one knots, and comparatively light armor. Naturally, when the battery approaches that of a battleship and high speed is provided, the weight for protection must be reduced.

These are very powerful ships intended for operation tactically as a fast wing for the battleship force. Strategically they may operate to drive commerce raiders from the sea, or as advanced offensive scouts.

The only ships superior to them in battery and protection are the battleships, and the battle cruisers have the speed to accept or refuse action with the battleships should they fall in with such a type.

At the time of the Washington conference, the United States had six of these great vessels building. By the terms of the Washington treaty, four of these battle cruisers were scrapped, and two, the *Lexington* and *Saratoga*, were converted into aircraft carriers.

When the terms of the London treaty are carried out, there will be six of these vessels in existence—three in the hands of Great Britain, and three belonging to Japan.

The Destroyer Leader—The destroyer leader is a large destroyer. It carries practically the same offensive weapons as a destroyer, has the same speed, and has the same lack of protection. It is designed to operate with the destroyers, and is usually built one unit to a fixed number of destroyers. As the name implies, it is built to be the leader of a group of destroyers, and have the quarters for the accommodation of a squadron commander and his staff. Experience has taught that a destroyer cannot efficiently furnish the signaling facilities required by an officer commanding and directing the operations of a number of destroyers in action. The leader is designed to meet these needs.

Strategical and Tactical Uses of Types of Ships and Their Tactical Objectives

Strategic employment of the fleet is the placing of naval forces, not in contact with an enemy, in such position as will best contribute to the success of a campaign.

Naval tactics deal with the handling of naval forces in battle.

The tactical objective of a type of naval craft is the enemy type or vessel against which it is to direct its force.

In considering the strategical uses of types, it is difficult to consider the types as separated from the fleet as a whole; however, there are certain classes of ships which may rightfully be separated from the fleet for detached or independent duty. Outstanding in this consideration is the cruiser. And this includes the battle cruiser.

In determining the number of cruisers which a navy needs, the first consideration should be given to the number required for duty with the battleships, after that the numbers and types required for distant and independent duty.

The uses of detached cruisers in war may be stated to be against enemy commerce and lines of communication, the protection of our own lines of communication and commerce whether in our own bottoms or in neutral bottoms, and for strategical scouting. Particularly in the case of the United States, this work requires the most powerful cruisers we may build under the terms of the Washington treaty. The reason for this powerful cruiser for the United States hinges on the long distances they would be required to travel on the trade routes with no bases for repair and supplies, the small number of large cruisers to which this country has agreed to limit itself under the London treaty, and the fact that there are six battle cruisers in the world, none of which is in the possession of the United States. In 1922 when the United States signed the Washington treaty she surrendered the right to lay down battle cruisers before 1931, and by the London treaty she further surrenders the right to build them before 1936 should she desire so to do. It must be remembered that with the small number of large cruisers the United States has agreed to have, it will be very difficult if not impossible for the commander in chief of the fleet to distribute them so as to cover all strategical routes where they should operate. This deficiency means that should one be lost or so badly damaged that she would be required to return to a base for repairs, there will be no relief for her, unless a cruiser is taken from

another area, and thus there will be a weakening of the force to cover some strategic area.

The cruisers on duty with the fleet should be of such design that they will be interchangeable with those away on distant missions. An occasion might arise where the fleet is more or less inactive at a base, during which time some of the cruisers attached directly to the battle fleet could be spared for duty on the trade routes, but if the fleet cruisers are of small, lightly gunned type, they will be useless on the service to which the large types are suited. In speaking of larger types, it must be remembered that this does not refer to large tonnage armed with small caliber guns, but to 10,000-ton cruisers armed with 8-inch guns.

While on a strategical scouting mission, should a cruiser meet an enemy vessel she should be able to destroy that vessel in order not to permit her own scouting formation to be broken. Vessels on a scouting mission in formation are not in a close formation, but the distance between units depends on the visibility and may be as great as sixty miles to ninety miles. Thus it is seen that there is no support or assistance at hand. If the scouting force is out with the mission to gain information as to the location and composition of an enemy fleet, the units of the scouting force should have the offensive power to pierce an enemy screen, which will most surely be composed of large cruisers.

The submarine is a type which also may be required to proceed long distances for the purpose of lying off enemy ports to attack hostile fighting craft entering or leaving those ports or bases, or to report such hostile movements. The submarine is the only type which can accomplish this task as she can hold station without being detected.

In the battle line, the battleship is the tremendously heavy fighting unit having the ability to deliver crushing blows and to withstand punishment which would destroy any other type. In a fleet action where we engage an enemy fleet having the same general types of ships as those which compose our own fleet, it is natural that we should exert every effort to destroy the enemy battleships. All units of our fleet must keep in mind that whatever action they take must be to support the battleships and aid them in accomplishing their purpose. The natural objective of the battleship then becomes the enemy capital ship. There may be intermediate objectives for the light forces, but these objectives are only for the support of the primary object which the battleship must accomplish.

The immediate objective of any type may vary in the course of an engagement. The cruisers have for their immediate objective the light forces of the enemy. They must drive off enemy light forces which may be endeavoring to prevent an attack by our destroyers on the enemy capital ships, or they may be required to provide security for our own battleships by breaking up an attack by enemy destroyers on our own capital ship line. They also must keep the commander in chief informed as to enemy movements which are out of his range of visibility. Cruisers may further be detailed to accompany aircraft carriers to guard them against attack by enemy light craft and to assist in the defense of the carrier against attack from the air.

The destroyer's rôle in battle is to deliver torpedo attacks on the enemy capital ships and to protect our own battleships and aircraft carriers from submarine attack. While the primary objective of the destroyer is the enemy capital ship, she should also be used against enemy aircraft carriers, and, if opportunity offers, she should torpedo enemy cruisers.

The light mine layers in the fleet battle are usually divided into two sections, one section in the lead of the battle line, and one section well in the rear of the battle line, in both cases toward the enemy. If opportunity presents itself, they may lay mines where the enemy will pass through them. The presence of these vessels ahead of an enemy battle line may cause that line to change course whether the mines have been laid or only a threat made. Their presence in the rear of the battle line is to enable them to lay mines in case of a reversal of course by the enemy. In planting their mine fields they should exercise extreme caution, keeping the units of their own fleet fully informed as to the location of the fields so as not to embarrass their own force.

In the fleet battle the submarine is a weapon of opportunity. Due to its inability to develop much speed when submerged, it cannot be rapidly moved from one position to another in relation to the battle line. Another disadvantage of the type in connection

with the fleet battle is the difficulty which a commander handling a fighting force would have in communicating with the submarine in order to direct its movements. Its primary objective is the enemy capital ship and aircraft carrier; however, if it has the chance to torpedo a cruiser, it should do so. It may be likened to a mobile mine field, but one whose mobility does not readily lend itself to rapid changes of position.

The aircraft carrier is a vessel whose capabilities have probably not been fully developed and which has not been tried in a fleet action. Its first objective, through the medium of the aircraft which it carries, is the enemy aircraft carrier. It should never expose itself to enemy gunfire if this can possibly be avoided. The objectives of the aircraft carrier change as the battle develops and progresses. Once the enemy carriers are located, our own carriers should endeavor to get bombers and torpedo planes into the air to proceed against them. At the same time, accompanying these bombers and torpedo planes, will go fighting planes for protection of the bombers against enemy fighting planes which will be sent out to frustrate attacks on the enemy carriers. The reason for this early attack on the enemy carriers is based on the fact that the force which gains and holds control of the air will have a great advantage in the general engagement, and one of the steps toward gaining this control of the air is to destroy the air base. The lighter planes flown from the decks of carriers cannot remain in the air for a long period of time due to their small fuel supply, and if there are no decks to which they can turn for refueling, they will be forced to land in the sea, where, even though they may not be destroyed, they will be useless.

Generally speaking, the battle for the planes will probably develop along the following lines: The observation or scouting planes will locate and report the enemy. Bombers and torpedo planes accompanied by a screen of fighting planes will proceed against the enemy carriers. Our own observation planes will take to the air for the purpose of observing gunfire. The bombers and torpedo planes will attack the enemy, concentrating on carriers, capital ships, cruisers, and submarines. At all times our own fighters must protect our own forces against depredations of the enemy air forces.

There is not sufficient room in this paper to go fully into the probable and possible employments of aircraft. This very brief outline must suffice.

The Fleet Cruising Formation

(See plate XXXI)

When the fleet puts to sea in the time of hostilities, it must be given adequate protection against surprise attack. This protection is afforded through the medium of light forces so disposed as to give timely warning of the presence of an enemy, and in case the enemy proves to be a strong body, the warning must be given in sufficient time to permit the fleet to deploy into a fighting formation. If the contact is not with a strong enemy body, then the light forces must by their dispositions and strength be able to drive him off before he can gain information as to the strength and disposition of our own forces.

In a formation this security is afforded by an outer screen of light vessels, sometimes submarines, which upon the approach of an enemy warn the fleet. Backing up this outer screen may be a second screen of light vessels with the strength to drive off light vessels attempting to break through. The distance between the outer screen and the second screen must be sufficient to allow a number of the vessels of the second screen to concentrate to meet the threat. Backing up these screens will be concentrated an attack force, usually cruisers, or cruisers and destroyers, which will have sufficient power to meet a force of the enemy which has fought its way through the outer screens. A support consisting of a number of battleships screened by destroyers will be so placed that it can move to any threatened area. Inside of this screening disposition will be found the battleships, aircraft carriers, and vessels of the train. Finally will be a rear guard of cruisers, or cruisers and destroyers to protect the main body and the train from an overtaking force.

The whole formation must be arranged to permit rapid deployment of the force for the approach to battle or directly to the battle formation.

The fleet may proceed to sea without the train, but this should make little difference in the cruising formation, the principles of protection and mobility remaining unchanged.

The large slow-moving ships and the aircraft carriers in the cruising formation must be protected by an anti-submarine screen composed of destroyers. These destroyers completely surround the ships they are screening, zigzag with them, and are constantly on the alert to ram a submarine or to drop depth charges on one which may approach the formation.

If the fleet is making a long passage overseas, it is customary, in order to guard against surprise during the night or at dawn, by an enemy force approaching on approximately opposite course, to station a long line of cruisers ahead of the fleet and across its course. This scouting force proceeds on the fleet course at fleet speed. The distance between the scouts and the fleet formation is equal to the distance which the fleet will travel during darkness, plus the distance an enemy would probably travel in the same interval of time. For example: there will be eight hours of darkness; our fleet is steaming at ten knots, and it is estimated that an enemy force which might possibly be met will be steaming at twelve knots. During darkness our fleet will steam 80 miles and the enemy will steam 96 miles. The scouting line should be placed 176 miles ahead of the fleet formation. It will be readily seen that an enemy force which is beyond the vision of the scouts at dusk, but which pierces their line during darkness, will not be able to reach our fleet formation until after daylight. To doubly insure the fleet from surprise at the critical periods of dusk and dawn, an air search is usually sent up late in the afternoon and at dawn to make sure that there are no enemy craft in the vicinity.

The Approach to Battle

The scouts having reported and verified the presence of the enemy at sea in force, and having reported his position, composition of his force, course, speed, disposition, etc., it becomes necessary for the commander in chief to make such disposition of his forces as will permit him to bring his whole fleet into action without confusion. He must decide on what courses he will fight, and must put his fleet on an approach course which will intercept the enemy.

The cruising formation is changed to an approach to battle formation, and the course so shaped that the enemy will be intercepted and the fleet readily swung into battle line. In this approach he must allow for the security of his own force and guard against surprise. The approach formation is generally so laid out that, when the time comes to swing to the battle formation, a simple change of course by units or by subdivisions of the fleet will place the fleet on a line which is perpendicular to the direction in which the enemy bears, thus allowing all units to come into action simultaneously.

In the approach the battleships are usually in the rear and center of the formation, with the light forces disposed on each bow several thousand yards ahead and advanced toward the enemy. The numbers of ships in the divisions of light forces may vary with different situations.

In the approach the aircraft carriers are placed close enough to the battleships to be under the protection of their guns.

The Battle Formation

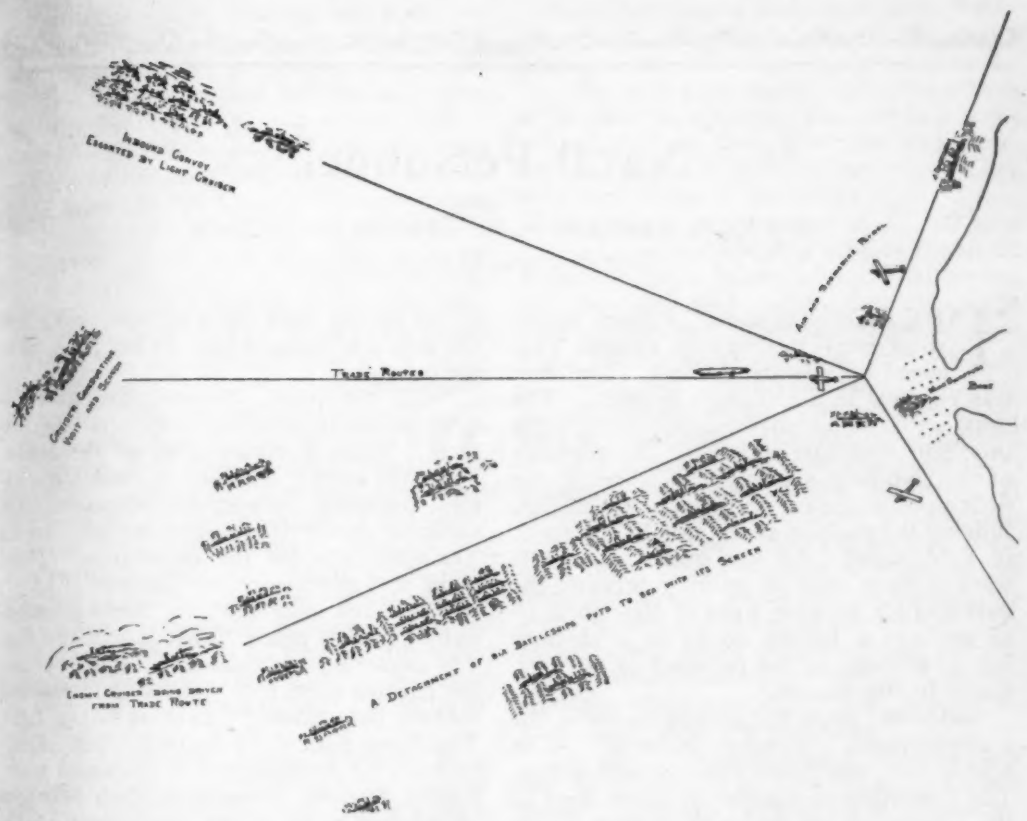
(See plate XXXII)

In this formation the battleships must have a clear field for their gunfire, and light forces must make every effort not to blanket their vision by smoke or to interfere with their gunfire or movements.

Ahead of the battleships and toward the enemy will be placed part of the light forces. Nearest the battleships, and from five to ten miles in their advance, will be found the attack destroyer squadrons. A few miles beyond these attack squadrons will be the light cruisers intended to clear the way for our own attack squadrons in attacking the enemy battle line or for breaking up an attack by enemy destroyers on our own battle line. Well beyond the light cruisers will be the light mine layers.

The formation to the rear of the fleet is similar to that in the van. The reason for the light forces in the rear is to have a new van light force should the battle course be reversed. It can be readily seen that should the commander in chief reverse course and it be necessary for the light forces which were in the van before the course was reversed to get to the new van, the battle would probably be over before they could reach station unless the battleships slowed speed.

Plate XXXII illustrates two fleets, of nine capital ships each, drawn up as opposing fleets. The fleet in the background is



USES OF VARIOUS TYPES OF SHIPS

sending in a destroyer attack supported by light cruisers.

The reason for the destroyers being well advanced in the battle formation, is to permit them the shortest possible run to the place where they may most advantageously launch their torpedoes, and secondarily, to keep them out of the range of the secondary batteries of the battleships.

The aircraft carriers would normally be on the disengaged side of the battleships at sufficient distance to permit them to maneuver for launching and landing planes without interfering with other units of the fleet. They must be far enough back of the battle line so as not to be endangered by shots which pass over and beyond the battleships.

In order that the units and divisions of a large fleet may become a homogeneous whole, with the actions of the subdivision so coördinated that the maximum effort will be brought to bear against the enemy, constant practice and drill are required. These drills work up progressively through various stages of target practices, unit or subdivision tactical exercises, strategical and tactical scouting exercises, and grand maneuvers where the whole fleet is concentrated. An important part of the training is the indoctrination of personnel gained through courses at the Naval War College and other service schools, through work in the fleet, and through conferences of the admirals of the fleet with the commanding officers of ships. Each admiral and commanding officer must be so trained that he will recognize the object which the commander in chief is striving to accomplish, and so trained that he will put forth his best effort in the most helpful direction to support the commander in chief.

The supreme test is the fleet battle, and here will be demonstrated the degree of success which the strenuous training has accomplished.

Naval Personnel

By Rear Admiral F. B. Upham, *U. S. Navy*
Chief of Bureau of Navigation

THE night was dark. Fifteen battleships were steaming in column, at a speed of seventeen knots. The fleet was engaged in a campaign problem. The ships were completely darkened save for the tiny light each carried aft for the guidance of the ship next astern. The officer of the deck stood at the forward end of the bridge, judging the position of the ship by the speck of light ahead. All was quiet. Lookouts were at their stations, peering through the darkness for possible signs of the "enemy," or perhaps a fishing vessel or a steamer which, unaware of the presence of the fleet, might be approaching.

Suddenly, from the steersman came the muffled shout, "Rudder jammed." The bridge was electrified into instant action. The possibility of disaster to other ships in the column or on the flank toward which the ship began to turn required instant action. Came the command, "Shift to steam steering," given quietly, but emphatically, by the officer of the deck. As suddenly, the command was repeated to distant stations.

Down deep in the bowels of the ship, two men, alone on their stations, stood by for just such an emergency. One of them, a quartermaster stationed in the tiller room, received the order. Another, stripped to the waist, stood his watch in the dank, hot, enervating atmosphere of the steam steering engine-room. Upon him depended much. Ill effects of the long watch in fetid atmosphere could not excuse sluggish action which might menace the safety of the ship. Always was action required. He realized it.

Quickly to the bridge came reply from those distant stations of "Ready." As quickly went back the final order, "Shift." Almost before the last sound of the order rang out, prompt action by trained hands completed their tasks, the steering engine wheezed and quickly started, racing violently as the rudder once more became active and the ship was brought back to her position in the column.

Skill, discipline, decision, action—these qualities are required in Navy men—fighting men. These qualities are not demanded. They are merely obtained. Tradition, custom, necessity, furnish the stimulus. Association and environment is the schoolroom. Training provides the curriculum. Hard work and experience are the textbooks.

The Navy man—fighting man—is essentially a man of peace. That is why he fights. The explorer, the business man, the banker, are fighting men, too. "Honor and ease are seldom bedfellows." Life is but a fight. The Navy man daily faces a crisis. Daily he faces the possibility of disaster and death. Eating, sleeping, living as he does over tons of explosive, he is not unmindful of the danger that ever faces him. Enclosed within the steel walls of his small home is power sufficient to supply electric energy for a city of a half a million inhabitants. All around him is concentrated energy which must be controlled and made to do his bidding.

It has been said many times that the Navy is the nation's first and last line of defense. It is more than that. It is the protector of the merchant marine. That is why it was first brought into existence, and in that capacity, in peace even as in war, it is active and it is indispensable. In war it serves its purpose by force of arms. In peace it is a guarantee of security by reason of the force it is capable of exerting, if necessary. It thus produces great moral effect. It is an insurance, morally and physically.

The uninformed may listen with arched eyebrows to the assertion that naval personnel does not find its sole use in the heat of battle and the destructive effects of war, and that its training is not devoted entirely to those ends. But as you tune in on your radio to listen to the world's greatest crooner, did

it ever occur to you that the soft voice you hear at one time sang out from the crow's nest, "Ship ahoy"? Or, as you listen to the words of wisdom of that philosopher, Amos, did you know that he was at one time a radio operator in the Navy? Are you aware that the officer in charge of the probation department of the Quarter Session Court of the city of Philadelphia was a yeoman in the Navy? Would it be interesting to know that the chief of police of Evanston, Illinois, that the head of a federal prohibition division in one of the largest cities in the country, that the managing editor of a large magazine published in the West, are former Navy men? Again, would it serve to mellow your opinion of the ultimate aim of naval training if it were demonstrated to you that a vice president of the Bethlehem Steel Corporation and the president of the Newport News Shipbuilding Company are former naval officers? Would it be illuminating to know that former naval officers are prominent in the aviation industry? These men were at one time in the Navy to fight if need be. Their training and their associations fitted them to fight the battle of life too.

Every year, gray-haired admirals pass into retirement after devoting their lives to the service of their country. Their service has given them no opportunity to prepare for the life of retirement. Too old to begin life anew, they must seek such happiness as they can from contemplation of service well done, in spite of its hardships, its disappointments, and its separations from family and friends. In truth, they have given their lives to their country. Entering the Naval Academy as they did at the formative period of their lives, the doors of opportunity of obtaining wealth and independence closed behind them. As they proceeded along the way, they saw the less hardy drop out, one by one, some young enough to enter a new life, others too old to do more than hope.

Every year, an average of 17,500 enlisted men are honorably discharged from the service, who never return. The Navy has given them an education and a training unexcelled. With youth as a prime asset, and with healthy bodies and trained and disciplined minds, they set out to seek their fortunes, and most of them succeed. They are never lost sight of. They are never forgotten. Throughout the land one encounters them. Always they possess pride in the service they have given. Their colleagues still in service are proud of their accomplishments. Trouble finds them ready. They have been accustomed to fighting. Disaster is a bugle call which calls them to render assistance. They answer the call instinctively. They give their services unselfishly.

Every year, an average of 17,500 new enlisted men and 400 new officers report on board for duty. What duty? What service will they perform? Boldly they step forth with confidence of success. Some of them have definite ideas of what they want to do—what they desire to learn. Others are actuated by the desire to become associated with an organization that has brought glory to their country, to the land of their forefathers. Still others know not why. It is these 17,500 men the Navy is most concerned with. They come and go, but never must there be the slightest decrease in the efficiency of the whole organization. For it symbolizes the power of the nation. The actual punch which the nation can deliver, in any form whatever—diplomacy, statesmanship, commerce, all of these are measured by the power behind them.

The youth who enters the Naval Academy may be presumed to have chosen his life's work. Gradually, surely, he is shaped by education and experience, to lead and to direct. He contributes to the solution of the problem of ever-changing enlisted personnel. As he grows older in service, he changes from one rôle to another, accepting reverses philosophically, and by the same philosophy is elated when success occasionally smiles—all this, however, in the full knowledge that he must realize the inevitableness of being misunderstood and perhaps not fully appreciated.

Personnel of the Navy may be likened to a structure housing a giant industry. The enlisted personnel who reënlist and engage in continuous service comprise the foundation. The superstructure is composed of the ever-changing mass of personnel who enter for one enlistment, are honorably discharged, and do not return. Officer personnel constitutes the corps of architects and builders. They must make the new material fit into the superstructure so that the industry within may go along without interruption or loss of efficiency. This, then, is the Navy's personnel problem.

Procurement, training, distribution—these constitute the Navy's work. Peace or strife, no matter which is current at the moment, the work goes on just the same, everlasting, unceasing. A fleet unmanned, lying at anchor or moored to the dock, is impotent. Officered and manned, it becomes a living entity. Personnel is the whole show. Without it there could be no navies. When combat upon the waters first became necessary back in the dark ages, oarsmen propelled the ships, and trained warriors did the fighting. As these trained warriors became accustomed to the sea, they began to acquire knowledge of ships. Ships of war were then built which were designed better to accommodate the warriors and to facilitate their fighting. As time went on, it became apparent that more power could be concentrated in a small space if the warriors were likewise required to have some knowledge of the sea and the ships which sail upon it. Through the ages great transformations were wrought, until today we see on capital ships every conceivable profession and trade —clergy, lawyers, doctors, artificers, artisans, etc. They perform the normal functions of their vocation. Each and every one can be transferred to a location on shore and his naval occupation will be useful to the public. They constitute the fighting men of today. The peaceful pursuit of their occupations on board ships of war, in conjunction with the whole, constitutes the individual's preparation for conflict. Verily, man is a bundle of habits.

The Navy has no great problem of making warriors of its personnel. Each man fits in his niche in the general scheme of things. It is the Navy's business to find the niche. Some find their niche; others are led to it and take possession. The business of finding the niche is interesting. Once found, the Navy man cannot lay on oars and rest. Farther up there is another niche of the same design but of greater dimensions. Every officer, every man, looks forward to the time when he will have outgrown the first niche and will step into the next one higher up. He must be prepared for this transition, otherwise it cannot be made.

Let us start at the beginning and see what happens, and let us consider officers first. The great mass of them is obtained through appointment to the Naval Academy where they undergo a rigorous course of instruction in that great educational institution. Appointments to the academy are made by each Senator, Representative, and Delegate in Congress, and by the Vice President. The President of the United States annually appoints fifteen. As many as one hundred enlisted men may be selected each year as a result of competitive examination. Twenty-five may be selected annually by competitive examination from among enlisted men of the Naval Reserve and Marine Corps Reserve. Appointments may also be made by the President from among the sons of soldiers, sailors, and marines of the Army, Navy, and Marine Corps, who were killed in action or died prior to July 2, 1921.

The academic education received by midshipmen at the Naval Academy is of the highest order. In addition, the course is so arranged that instruction is given in subjects which may be said to be peculiar to the Navy itself, although in not a single case does the study fail to find its use in civil life. As a case in point, consider that world-wide mystery, the torpedo. Its particular use is, of course, in warfare. The torpedo in its existing state of development combines in its many parts the highest form of development those parts in some measure represent. Its motive power represents the latest and best in turbine engine design. The air within its flask or tank leads the way in the use of the air compressed into the least space and to the highest pressure. Its explosive charge was a forerunner to the pyralin industry. It even requires a small amount of alcohol which, however, is used, not in defiance of law, but in compelling respect for it.

Graduates of the Naval Academy enter the Navy on equal terms. Their niche has not yet been found. Continuing their studies aboard ship in order that they may properly discharge their duties with credit to their pride, gradually they find themselves and determine the things most to their liking. One may become most interested in electricity; another in gunnery; this one finds tactics most to his liking; that one desires to delve deeper into the mysteries of radio. And so it goes. A way is offered to each and every one by which he may satisfy his quest for knowledge. Numerous courses of special instruction in optics, fire-control instruments, torpedoes, etc., are open to them. For those who desire more complete mastery

of their hobby, postgraduate instruction is afforded in a large variety of subjects. Be it understood here that every one of the postgraduate subjects of instruction is one which prepares the students equally for greater efficiency in the Navy, or for a great sphere of usefulness in civil life. As a result, the Navy has in the past and will ever contribute to industry service of immeasurable value.

The graduate of the Naval Academy occupies a status entirely unlike that of the graduate of a civilian institution of learning. The Navy is not through with him when he receives his diploma. From that time on, all eyes are upon him. His career is watched with the greatest interest. He, in turn, is interested in all those who graduate after him. Such interest gives to the Navy the greatest individual and collective efficiency. It also serves as a means of providing the Naval Academy with standards by which to judge the efficacy of the curricula and the thoroughness of its methods of instruction. The large number of graduates at the Naval Academy who have served their country well, both in the service and in civilian capacity, is a sufficient commentary upon the excellence of the institution and its methods.

Now consider enlisted personnel. Scattered throughout the land are forty primary recruiting stations. Each one of these stations is presided over by an officer of experience—picked for the place. With him is a corps of enlisted men. Each man in this corps has been given special instruction in preparation for the work he will have to perform. Each one is impressed with the idea that in dealing with possible recruits; truth and honesty must prevail. They are proud of their service in the Navy, and they are anxious to describe its benefits to all who desire to know. And they guard zealously their colleagues' welfare. They have no desire to recruit in quantity. They insist upon quality. Quality does not include social standing. The boy from the farm, the youth from the mills, and the children of densely populated cities, have equal chance to enlist. A sound physique, a good average education, and a clean personal record are the requisites.

The old idea that the Navy is a good place for the correction of incorrigibles has, happily, been dissipated. The opportunities offered to recruits are so great that many more thousands apply for enlistment than are chosen. The law of supply and demand holds good in recruiting as in industry. The salesman who presents the best line of goods makes the greatest volume of sales. The man who comprises the required qualities for service in the Navy, to the highest degree, gets the first call. The standard of candidates for enlistment has mounted higher and higher. Not so many years ago the man with a sixth-grade education found no difficulty in entering the Navy. Now his chances are slim indeed. Today, candidates for enlistment are all required to pass a mental expertness test. The inclusion of this test in recruiting requirements has produced most gratifying results. Initial studies of the results indicate a high standard of comprehension of naval ideals. It has brought about a condition where recruits of today indicate the ability of quickly adapting themselves to the new life.

All recruits are sent to training stations. There the search for the niche begins. After the dust of the streets has been brushed off, the most apt are sent to service schools where they begin the study of the fundamentals of many trades. From there they pass on to the fleet. Arriving on board, they carry with them a record of what they have accomplished while under training. Their records point the way to the paths they should follow. Thus the officers who receive them on board and who are to mold their future are given a clue to the niche for which each one should head.

Life on board a man-of-war includes compulsory instruction in the art of being a man-of-war's man. This instruction fits them to be directed as a mass, but there is a greater means of training open to every enlisted man of the Navy. His sovereignty lies in his knowledge, and knowledge cannot be acquired by injection. Fully realizing this, the Navy has instituted a system of education and training that has no parallel. Upon every ship there is an educational organization established for the purpose of affording means of instruction to any man who desires it. The Bureau of Navigation furnishes the vessels thousands of pamphlets covering scores of subjects. Until very recently, the advantages of the system of instruction were given only to volunteers. The benefits, however, have been so great

that most units of the fleet require attendance upon the courses of instruction as a prerequisite to promotion.

The training courses available to enlisted men under the general scheme are of three kinds: (a) Rating courses; (b) General technical courses; (c) Academic courses.

The man who has found his niche will usually take the courses that are designed to increase his skill and to prepare him for advancement in rating. The man who is well established in his own particular branch or rating is likely to desire to further his education by taking the general educational course, and also he may take the course which tends to increase his skill. The seaman second class who has his niche to find will usually take the general educational course until he has found himself on board ship and has discovered something to his particular liking. Having found such a subject, he then has full access to the technical course of his choice, and soon he is well on his way to a sphere of usefulness, both to himself and to the service.

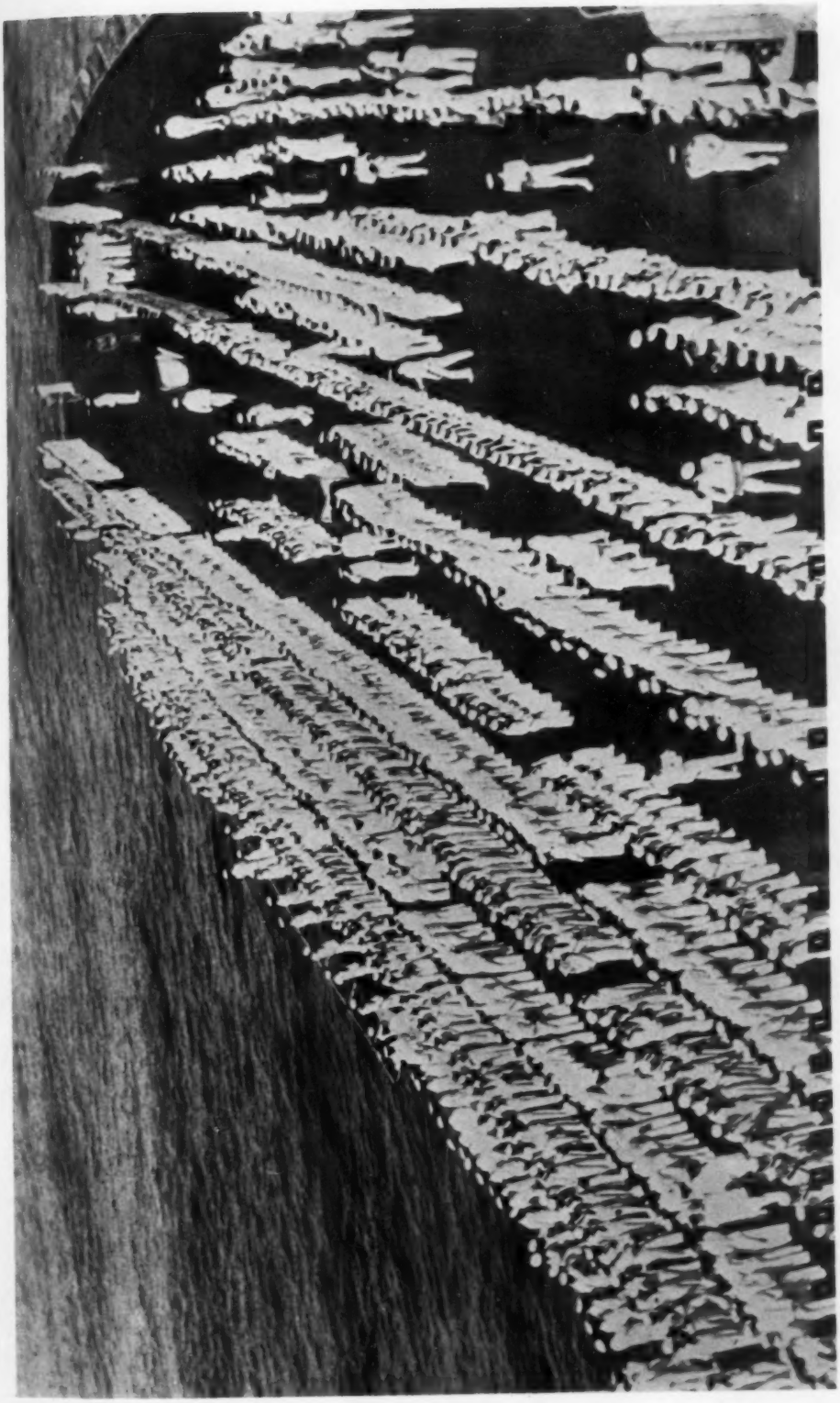
There are other courses open to enlisted men which provide advantages he could not obtain on board ship. Such courses usually include shop experience in well-equipped shops, taken in conjunction with academic work; and courses in which proficiency to be fully attained requires close application, untrammeled by other influences. Men whose records afloat are indicative of promise for the future are ordered to schools ashore where they are thus given opportunity to further their education in their chosen lines of endeavor.

The Navy is not a floating university. It is, however, a great school of opportunity. The idea of compulsory education was never received with much sympathy. The Navy believes that every man has a natural bent; he will find his niche if given the opportunity. Surround him with the means only of being amused and he is sure to degenerate physically and mentally. Provide him with the means of amusement at the time when diversion is most beneficial, and he is willing to indulge in the more serious features of life. It follows then, that given a chance to benefit himself by study, he will grasp the opportunity. As he visualizes what the benefits of self-help procure for him, as he does visualize day in and day out in the hundreds of smart, educated, and trained petty officers with whom he associates, his ambition is sure to be stirred. This, then, is the Navy's idea of naval education and training.

In the Bureau of Navigation there are two divisions which deal with the distribution of naval personnel. One assigns officers to duty; the other assigns enlisted men. They have niches to fill. Officers and men there are in barely sufficient numbers to permit them to accomplish their tasks. All men are not cooks. There must be cooks in sufficient number but not too many. All artificers are not machinists. There must be a sufficient number of machinists. Always there are niches to fill and there always will be. It is a comparatively simple matter to fill the niches if properly educated and trained men are available. There is no greater work, no greater service to the Navy, or for that matter to mankind, than to provide properly trained men to meet all requirements. This, then, is the Navy's great work in peace or in war. It is unceasing, everlasting.

Officers and men are proud of their ships, of their airplanes, and of everything material that forms a part of the Navy, be it large or small. Those whose duty it is to maintain material in efficient condition and ready to respond at any moment to the demands made upon it are proud of the tools placed in their hands . Philosophically they take what is given them, lavish great care amounting almost to affection upon the ships and machines they must operate, and they take great pride in the results they obtain. Not a single officer, however, thinks of the material Navy except in terms of the personnel which must operate it. No greater body of men—fighting men—exists anywhere. No more law-abiding, unselfish population, ready for instant self-sacrifice, can be conceived of. They are entitled to the best that there is. The Navy works hardest when its efforts are devoted to the benefit of its personnel. Every minute thus devoted insures the excellence of material.

Naval personnel — sportsmen — fighting men. Relentless in their striving for the betterment of their ship, their fleet, their service, they command the respect of their superiors. Whatever the conditions imposed they meet them with all the air and assurance of a true sportsman, the athlete trained for the struggle. Wherever you go you "shall not look upon his like again."



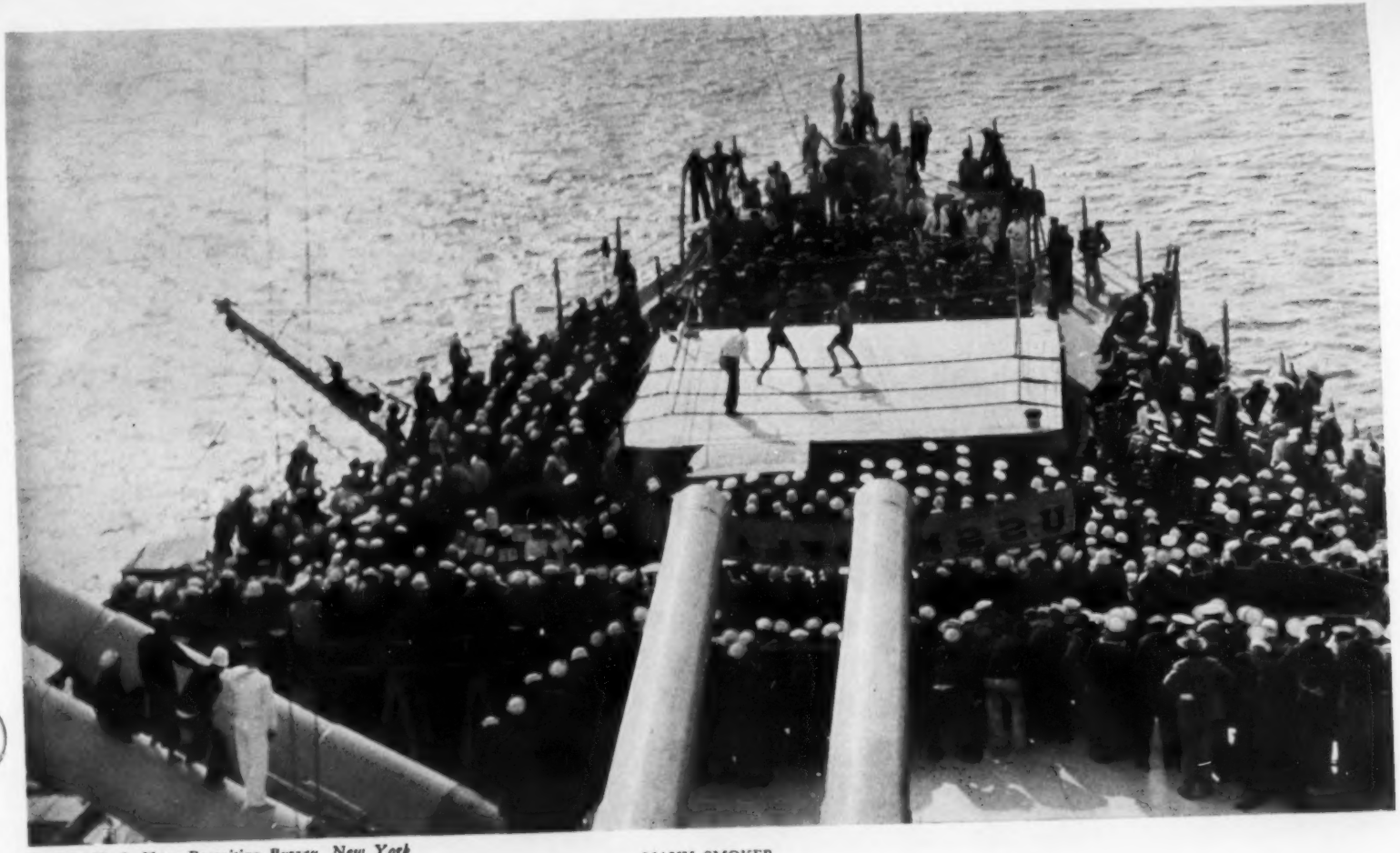
CAPTAIN'S INSPECTION

Courtesy Office of Naval Intelligence, Navy Department

UNIV. OF MICH.

Courtesy Commander C. C. Slayton, U. S. Navy

THE MACHINE-GUN SQUADS



Courtesy U. S. Navy Recruiting Bureau, New York

NAVY SMOKER

UNIV. OF MICH.

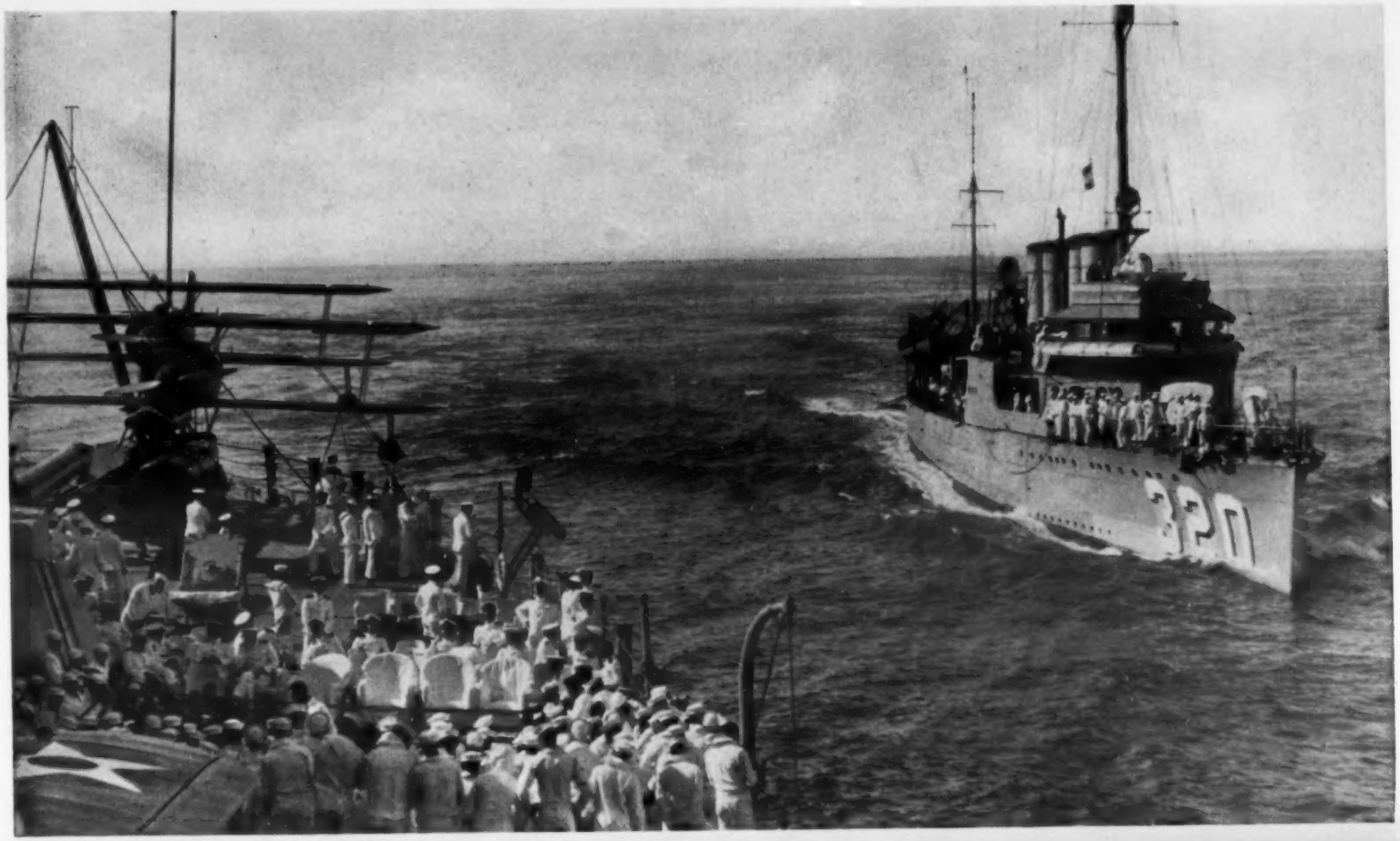
Courtesy U. S. Navy Recruiting Bureau, New York

A NOONDAY CONCERT

Courtesy U. S. Navy Recruiting Bureau, New York

U.S.S. *ARKANSAS* PASSING THROUGH MIRAFLORES LOCKS, PANAMA CANAL

UNIV. OF MICH.



Courtesy U. S. Navy Recruiting Bureau, New York

A DESTROYER COMES ALONGSIDE THE FLAGSHIP FOR ORDERS

Courtesy U. S. Navy Recruiting Bureau, New York

A DESTROYER COMES ALONGSIDE THE FLAGSHIP FOR ORDERS

Courtesy Office of Naval Intelligence, Navy Department

A FLEET IN CRUISING FORMATION, SHOWING THE LIGHT FORCES IN THE VAN, AND THE REAR GUARD (See page 899)

Courtesy Office of Naval Intelligence, Navy Department

BATTLE FORMATIONS OF TWO OPPOSING FLEETS (See page 900)

Types *of* Ships *and* Why

By Rear Admiral Luke McNamee, *U. S. Navy*

IN THE dim ages of the past warfare was the normal state of man. At first fighting was limited to the land. Then boats were invented and some predecessor of the wily Odysseus conceived the idea of fighting at sea. Probably such sea fighting commenced with the raids of individual ships with no higher object than plundering some defenseless village or trading ship. These trading craft were short, broad, clumsy, and slow. Their motive power was a single square sail. They were poorly adapted for war. The piratical Greeks designed a new type of ship for fighting. It was the galley—long, narrow, and swift. It was propelled with three banks of oars at a speed of some ten knots. At the bow was a heavy iron ram. Trading ships were helpless before this formidable foe.

The state whose ships and coasts were raided by such craft had to build similar ones in self-defense. These vessels did not limit their activities to defending their own coasts and merchant shipping. Attack, then as now, offered more opportunity for success than defense. So they retaliated by raiding the hostile coasts and shipping. It is probable that this trade warfare—as we would call it today—was carried on at first by individual ships. Then, as today, a large ship in individual combat could beat a small one. So a competition arose as to which could build the largest. First the thirty-oared ship was the king of the seas. Then the fifty-oared galley rendered all this type obsolete. Finally the three-banked galley, or trireme, became the standard type.

Then numbers became the measure of naval strength. Some brilliant leader conceived the idea of grouping a number of ships together for cruising and fighting. When this plan met with success, the enemy state formed a still greater number into a squadron. The first state then called in all its allies and combined their squadrons into a fleet. Naval warfare changed from a series of disconnected minor combats between individual ships into carefully planned campaigns and terrific battles between massed fleets on a scale unknown even today. Many more men fought at Salamis than at Jutland or Trafalgar.

Now in war there is always a temptation to win easy successes. A raid against defenseless shipping is less dangerous to officers and crews than a fight against warships. So when the opposing fleets were still quite distant and battle did not appear imminent, it often seemed good policy to detach a squadron to raid the enemy's coasts and shipping. This plan was particularly attractive when a commander had superior numbers. In addition to giving an opportunity for some cheaply bought material successes, such operations often had a real advantage. It was probable that such a threat would induce the enemy to detach an even greater squadron for defensive purposes. It was for such an object that Xerxes was advised to detach a large squadron for a demonstration against Sparta. However, when such a detachment is made from our fleet, there is always a very strong possiblity that the enemy will let it win its easy victories and advance with his full strength upon our depleted fleet. If he wins a decisive battle over our fleet, he can then turn upon our detachment and its previous victories will count for little. It was for this reason that Xerxes did not accept the suggestion of his adviser, but kept his fleet concentrated for battle. Then, as now, battle was the deciding event of naval warfare. Raiding attacks were of real value only as they induced the enemy to weaken his fleet and increased our chances of winning the decisive battle.

As trading developed people became increasingly dependent for food, clothing, and other necessities on imports from foreign shores. To buy they had to sell; so the marketing of their own products was

BATTLE FORMATIONS OF TWO OPPOSING FLEETS (See page 900)

Courtesy Office of Naval Intelligence, Navy Department

equally essential. Insular countries or those ill-favored in land transportation were driven more and more to the open highways of the sea.

These conditions gave birth to "sea power," which is nothing more or less than ability to control the lanes of ocean traffic to one's own advantage. The use of sea power was as natural and inevitable as trade itself, but not until the coming of Mahan was the vital part it had played in the history of civilization fully realized.

In a war against a people vitally dependent on imports for daily existence sea power alone may be decisive. Indeed under modern conditions of universal trade, the successful prosecution of a major war without adequate sea power would be well nigh hopeless. Man is a land animal. He does not live in the water nor in the air. So in any war that means a fight for existence we can expect to compel victory only by occupying the land that is essential to the enemy's maintenance. Normally this can be done only by soldiers—infantrymen. Blockade by ships might arrive at the same result by starvation, but as a rule we must fight and occupy the disputed land. Broadly speaking, all weapons—artillery, tanks, chemicals, aviation, battleships, cruisers, submarines, and the rest of it—are but auxiliaries helping the doughboy to occupy that piece of land vital to the enemy.

In war the ultimate mission of the Navy is to exercise the sea power, to control if necessary a world-wide service of supply. The object of a naval battle is to destroy the enemy navy so that we may be free to exercise that control.

While it is always essential to destroy or contain the enemy fleet, it must not be forgotten that we fight only in order to exercise that ultimate function of the Navy, which is to control the sea so that we may transport our men, our own supplies, and our own trade, and at the same time deny this use to the enemy.

To win a naval battle we must perform two tasks: first, find the hostile fleet; and then beat it. To locate a hostile fleet and keep our commander constantly informed of its position, course, and speed is a task of great difficulty and importance. We have organized the Scouting Fleet to perform it. This fleet also endeavors to prevent the enemy from gaining essential information of our dispositions. Its cruisers, destroyers, submarines, and aircraft harass the enemy constantly during the approach to battle to reduce his strength and exhaust his personnel. Once the enemy's battle fleet is brought to bay, the divisions and squadrons of the Scouting Fleet unite with the Battle Fleet to assist it in decisively beating the enemy. After the battle it leads the pursuit, in case of success, or covers the retreat of the Battle Fleet, in case of defeat. Practically all our combatant ships are assigned to the Battle and Scouting Fleets. This is conclusive testimony to the importance we place on battle in naval warfare.

When one fleet has decisively beaten the enemy or when the enemy fleet is so weak that it cannot fight with any hope of success, trade warfare begins and the shipping of the weaker nation is swept from the sea. Its navy, unable to contend in battle with our stronger fleet, endeavors to attack our trade. We try to defend it by a blockade of enemy ports, the escort of convoys, and patrolling cruisers. The operations of the Civil War are an excellent illustration of this situation. The last two years of the World War saw the Germans giving priority to their submarine war against merchant vessels. But despite the tremendous menace of this attack the British continued to give priority to their Grand Fleet and kept it in constant readiness to locate and destroy the High Sea Fleet whenever it should put to sea.

Other operations in the exercise of control of the sea are the capture and defense of naval bases, the escort of expeditionary forces, and the covering of their landing on hostile coasts. Our Control Force is organized to perform these various secondary naval missions. This force "exercises" the control of the sea, after such control has been "secured" by the combined operations of the Battle and Scouting Fleets. During peace time it contains only a few vessels, but it would be largely augmented after war begins.

To provide a moving base for the fleet, with complete repair and supply facilities, we have the Fleet Base Force. This is composed mostly of auxiliary vessels, with a few small combatant ships for local defense. These two fleets and two forces compose the United States Fleet. In war this fleet would be accompanied by a Marine Expeditionary

Force to seize and hold temporary fleet bases.

The United States Fleet is composed of various types of combatant and auxiliary vessels. Each has been developed to perform one definite mission, though it may be used for others with reduced effectiveness. To be most effective in war a fleet must be composed of all necessary types in their proper proportions. It is then said to be balanced. A balanced fleet gives a nation the maximum value in naval security for the money appropriated.

The great 30,000-ton, 21-knot, heavily gunned, strongly protected battleship is still the backbone of the fleet. With the aid of observation planes catapulted from its decks it brings tremendous fire power upon an enemy distant 30,000 yards. It has three lines of defense against projectiles, torpedoes, mines, and aircraft bombs. Lines of cruisers, destroyers, and aircraft provide a screen through which attacking craft must fight their way. Powerful batteries of medium caliber guns mounted on the battleships themselves fire directly on approaching destroyers, submarines, and aircraft. Heavy layers of armor and division of the under-water hull into small watertight compartments provide a third and final means of defense. While the battleship cannot claim to be unsinkable, it is very much better protected than any other naval type and can withstand very heavy punishment from all weapons of attack.

Because battleships fought so seldom in the World War an impression grew that they were useless. This fact actually has an entirely different interpretation. It was because of the immense value of the battleships and the fact that if lost they could not be replaced for three years that naval commanders were so reluctant to throw them into a battle. The loss of six or eight British battleships would have created a tremendous impression in allied countries and throughout the world. The destruction of that number of German ships would have meant the loss of the naval campaign and probably the war. When we remember that an hour's fighting might have had such results, it is easy to understand why a commander did not lightly throw his battleship column into battle. While it is true that the Grand Fleet was handled in a very cautious manner during the first half of the war, it was always ready to fight whenever the security of British sea communications was menaced. While a more aggressive policy might have won a quicker decision, it must be remembered that the battleships of the Grand Fleet always "secured" the control of the sea for the British. The gold reserve of the United States is seldom used, but just the knowledge that it is available for use secures our national credit. Just so do our battleships constitute a reserve which is ready always to secure our national defense on the seas.

On occasion battleships may be used for missions other than battle. They may be advanced as a supporting force for the Scouting Fleet, as was the Fifth Battle Squadron at Jutland. Having no battle cruisers, we probably would have to use a division of them for this important mission. They may also be used temporarily to assist the Control Force in its tasks. Thus the British battleship *Queen Elizabeth* was used to bombard shore fortifications at the Dardanelles and the German battleships were used for a similar purpose in the attack on Oesel Island in the Gulf of Riga. They may be used as escorts for convoys—as was done by divisions of the Grand Fleet in the North Sea. Generally battleships are used for such secondary duties only when they will be able to rejoin the fleet in time for a battle or when our fleet is so superior as not to require their services in battle.

To perform some of these secondary duties of the battleship and to supplement the battleship in action Sir John Fisher effected a combination of the battleship and cruiser types—the battle cruiser. This was virtually a fast battleship, armor and armament being reduced somewhat to give the excess speed. This was made about thirty knots. The guns were of the same size as those carried by battleships, but usually two less in number. The armor was several inches thinner.

The battle cruiser has two main functions. The first is to provide a backbone for the Scouting Fleet. The second is to form a "fast wing" ahead of the battleship column in a fleet action. From this favorable position their concentrated gunfire and superior speed allow them to force back the head of the hostile battle line. They can also drive the enemy cruisers out of the area ahead of the fleets. That in turn lets our cruisers

drive out the enemy destroyers, so that our squadrons may launch their torpedo attacks against the enemy battleships. Thus battle cruisers are essential for both scouting and battle. The British made a serious mistake in the design of their battle cruisers. They sacrificed armor too much for speed and armament. The loss of three of their ships at Jutland was the result. The Germans did not fall into the same error. They retained sufficient armor. Their ships gave a remarkably fine account of themselves in the battle and demonstrated conclusively the value of this type.

Battle cruisers often are used temporarily for control force missions. The British sent two to the Falkland Islands to destroy von Spee's cruiser squadron and then one to the Dardanelles to bombard the Turkish batteries and watch the *Goeben*. The Germans used the *Goeben* to attack Black Sea ports and to make sorties against the British forces blockading the Dardanelles. In the Washington conference, battleships and battle cruisers were combined into the general category of "capital ships."

After the capital ship the cruiser is the most important naval type. As the battleship developed from the old "ship of the line," so has the cruiser evolved from the fast frigate of a century ago. Recent cruisers displace from 7,000 to 10,000 tons, with a decided preference for the latter figure, the limit imposed by the Washington conference. Guns vary between eight and six inches, with a preference for the former. The armor is thin. Speed is about thirty-two knots.

The importance of the cruiser comes from the fact that it is an all-around ship. It is essential for all three of the main forms of naval warfare—battle, scouting, and control force missions. In battle, cruisers are too weakly protected to engage the hostile capital ships, except that occasionally in poor visibility they may fire torpedoes with effect. They take station in advance of the battle line and fast wing. Under cover of their gunfire the cruiser divisions drive back the hostile cruisers and destroyers. Thus they envelop the hostile battle line and permit our destroyer squadrons to fire their torpedoes from this favorable flanking position. Fleet actions are fought at such long ranges and are so obscured by smoke that it is impossible for a commander in chief to see with his own eyes what the enemy, and even his own, forces are doing. A remarkable instance of this occurred in the Battle of Jutland. The published diagrams of both commanders in chief—issued several years later—demonstrated that neither had the slightest idea of how his opponent had maneuvered during the fight. Had the cruisers been charged with the mission of obtaining this information of the enemy and properly trained in the methods of getting it, the battle would not so have resembled a game of "blind man's bluff." The performance of the Second Light Cruiser Squadron shows what might have been accomplished. The scouting planes now carried by cruisers will greatly facilitate their performance of this important battle mission.

Cruisers play a leading part in all scouting operations. For many years the light cruiser was called "scout cruiser" in our service in recognition of this fact. The cruisers are arrayed in one or more scouting lines in advance of our battle fleet; sometimes a screen of cruisers is disposed on the flanks, or even in our rear. Our ships on the scouting line develop the scouting lines or screens of the enemy. They endeavor to push them back or break through to locate the hostile battleships. It is not enough that the enemy should be located once. His position, formation, course, and speed should be reported to our commanders at frequent intervals both before and after battle. To accomplish this task, in spite of the ever-present difficulties imposed by enemy action, darkness, and fog, is one of the most difficult duties in naval warfare. The same cruisers which execute this scouting mission will rally on the fleet for battle. We can't have too many of them.

The third main function of cruisers is to attack and protect trade. As long as two fleets are face to face, a commander in chief will be loath to detach any of his cruisers for such secondary operations. If his fleet is beaten through lack of cruisers for scouting and battle—and when have there ever been enough?—it will mean nothing that he has temporarily protected some of his trade or captured some of the enemy's. Mahan spent his entire life teaching this fact to our Navy. Battle is the decisive event of naval warfare. Woe to us if we ever forget that teaching of the world's greatest naval authority.

Nevertheless, when a fleet action appears

improbable or when we have a considerable margin of superiority, it is permissible to detach a certain number of cruisers, usually the older ones, for secondary operations. These may be used for escorting convoys along the most vital trade routes or for attacking the enemy's trade by close blockade or distant cruising. As the trade routes cover such wide areas and there are now so few cruisers available for their protection, it is far more profitable to attack the enemy's trade than to try to defend our own.

There are other control force missions of temporary importance for which cruisers are essential. One of these is the escort of Army expeditionary forces and the covering of their landing on a hostile coast.

If the enemy has no battle fleet or if it has been destroyed, control force missions become immediately of primary importance. Our cruisers and even capital ships may be used for such missions.

The destroyer—or, as it was originally called, the torpedo boat—was designed primarily for firing torpedoes against capital ships. At present the destroyer ranges from about 1,000 to 2,500 tons. It carries six to twelve torpedoes. It mounts 4- to 5-inch guns. Its speed is about thirty-five knots. The larger vessels of this type are called "leaders" by the British; they are used as flagships for destroyer units. The French, Italians, and Japanese are building large destroyers for general service. The French 2,500-ton superdestroyers are virtually small cruisers. It is probable that they would be used as such.

The primary mission of the destroyer is to make massed attacks on the hostile battleships in the height of a fleet action. With the support of their cruisers, they must fight their way in as close as possible to the hostile battle line. In this position they fill the water with dense torpedo salvos. If possible, these salvos are fired simultaneously from different positions. Then they will converge upon the enemy from several directions and make it difficult, if not impossible, for his ships to avoid them by maneuvering. In the World War it was found that the destroyer was an excellent antidote to the submarine.

Destroyers may also be used to make unsupported attacks on battleships under cover of darkness. Such attacks may be made either before or after a fleet action. While destroyers are poorly designed for long-range and long-continued scouting, they are well fitted to search a small area during a single night.

Destroyers are useful for all forms of control force action. They are invaluable for escorting convoys of merchant ships through areas where the enemy's submarines are active. They are useful for all kinds of patrol, and for mine laying and sweeping. At Gallipoli they were used for landing troops on a hostile coast. The destroyer, like the cruiser, is a handy all-around ship. It contributes greatly to naval strength.

The submarine is a comparatively new addition to the list of naval types. Its chief advantage is its power of concealing itself by submergence. But this very characteristic imposes two important limitations—low speed and poor communication. Thus the submarine is an individual weapon. It cannot be used effectively in massed divisions or squadrons. Strong reliance, therefore, cannot be placed upon its effect in battle. It is a weapon of opportunity. To a fleet acting aggressively and trying to force battle upon the enemy, it is not of great value. On the other hand, when a defensive action is being fought it may be used with more effect. Then a group of submarines may be placed in a fixed area and the hostile fleet drawn through it. It was this maneuver which Jellicoe feared at Jutland and which the Germans used with some success on August 19, 1916—sinking two British light cruisers.

In general, submarines are not suited for scouting operations. But once a hostile fleet is located they may be used for trailing it. Such a task, however, is easier to perform on the game board than in actual war. They also may be stationed off hostile naval bases to observe and report enemy vessels passing in and out. The World War did not demonstrate that the submarine was very effective for any of these scouting duties.

The submarine is at its best when assigned control force missions. In the World War it proved an effective weapon against merchant shipping where a great volume passed through a small area and when it could attack without observing the usual rules of visit and search. At the end of the war the efficiency of various counter measures decreased the results of the German submarine campaign. While none will again

try to win a war with the submarine, still it remains a serious menace to merchant shipping—even if the rules of visit and search are observed. Against naval vessels the submarine proved less effective, but its mere presence created a strong moral effect and compelled extensive counter measures. It is highly effective for laying mines secretly in enemy waters. It is also excellent for coast defense. Von Hersing in the little *U-21* worked wonders at Gallipoli.

The submarine has a moral and harassing effect rather than a decisive one. It compels the enemy to be constantly on the alert—day and night. It causes him to take precautions and make preparations everywhere. Thus the submarine creates a powerful diversion rather than gains the decision. It is an exceedingly valuable weapon, particularly for defense.

The aircraft carrier is the latest thing in naval types. Though it has never been tested in battle much is expected of it. Its development has just commenced. In fact very few ships have been built originally to carry planes. Nearly all of the present carriers have been converted from other types of naval craft. For this reason, many are not entirely satisfactory in design. Further advances may be expected when ships are designed and built exclusively to carry planes.

The carrier is merely a movable floating base for aircraft. Its speed facilitates their take-off and landing. The carrier has some light guns, but it fights unwillingly—and then only in defense. It is used primarily for battle and scouting. In battle its fighting planes endeavor to gain the control of the air above the opposing fleets and clear it of hostile aircraft. Its bombing planes attack the hostile carriers, cruisers, destroyers, and—when conditions are favorable—the battleships. Its torpedo planes attack the battleships from their unengaged side while our destroyers are attacking from the engaged side. The object is to put the enemy between two fires. If he runs away from the torpedoes of the destroyers, he runs into those launched by the planes.

In scouting operations carriers take station in or behind the scouting lines of cruisers. Their planes scout the area a hundred or more miles ahead of the line. When contact is made with the enemy, reconnaissance is made in that area to locate his battleships and determine their formation, course, and speed. This information is made the basis for harassing attacks by destroyers, submarines, and aircraft and is used for bringing our battle fleet into contact with the enemy.

Carriers are useful in attacking and protecting trade mostly for the information they give other naval types. Alone they are not well suited for such operations because of their inability to fight—except with their planes. They are useful in other control force missions, particularly the covering of a landing of troops on a hostile coast. Without the control of the air such an attack would be almost impracticable. Carriers are too expensive a weapon to be used often for bombing attacks on hostile seaports. Their own vulnerability to attack from the air is their greatest limitation.

In addition to these chief types of combatant vessels, there are other minor types, such as mine layers, mine sweepers, sloops, and patrol craft of many kinds.

We have many kinds of auxiliaries which are essential for the supply and repair of the fleet. These form virtually a movable base for the fleet and as such are just as essential for the proper operation of the fleet as the combatant types. The principal types of these craft are: destroyer, submarine, and aircraft tenders, repair ships, hospital ships, transports, store ships, cargo ships, oilers, and colliers. Their numbers will be augmented greatly during war by the conversion of merchant vessels.

In conclusion, we must again emphasize the necessity for a balanced fleet. For each task in naval warfare there is but one type best suited. If that best type is not available in sufficient proportions, the task must be attempted by some other type which is less effective for that particular operation. The enemy may be expected to exploit our weaknesses by using those forms of warfare for which we are least prepared. Also, each type is dependent upon the support and assistance of other types. Thus deficiencies in one kind of ship reduce the effectiveness of all the others. A properly balanced fleet is as effective in war as one which is larger but deficient in several important types. The British and Japanese today have perfectly balanced fleets. They derive from that fact an advantage not tabulated in the articles of any treaty on naval limitations.

The United States Marine Corps

By MAJOR GENERAL COMMANDANT BEN H. FULLER, *U. S. Marine Corps*

MARINES of Phœnicia, Egypt, Greece, Carthage, and Rome all performed the same character of mission as that of the modern American marines—serving as soldiers on board the fighting naval ships and as expeditions prepared to carry on land operations in support of the fleets. Roman marines of Caesar landed in England and enlisted ancient Britons to serve under their colors. The Royal British marines were organized in 1664. British-American colonial marines of Spottswood and Gooch served under Vernon at Carthagena City and in Cuba in 1741. Lawrence Washington, brother of George Washington, was one of them.

Lexington came on April 19, 1775, and the "shot heard round the world" was fired after Major Pitcairn of the Royal British marines had cried out, "Disperse you rebels!"

The word "marines" first appeared in recorded United States history in May, 1775. Continental Congress first used the word on October 5, 1775. With thousands of American marines serving on Continental and state warships and on privateers, Congress by the Resolution of November 10, 1775, created an *organization*, a *corps*, of marines. Marines can claim an earlier birthday but have selected November 10 as their natal day.

National economy wiped out the Army and Navy with its corps of marines at the close of the Revolution. From 1794 to 1798 marines were authorized as part of the complement of every naval vessel ordered to be built by Congress. Then, on July 11, 1798, Congress and President John Adams created the modern organization of *sea soldiers* known as the United States Marine Corps. The first headquarters was at Philadelphia and moved to Washington in 1800, where it has been ever since.

The Marine Corps is an element or unit of the naval service and normally subject to the laws and regulations established for the government of the Navy, but Marine Corps Headquarters is not an intimate part of the Navy Department in the same sense as is the Bureau of Navigation, or the other bureaus of the Navy Department. The Marine Corps is a military organization (composed of soldiers trained to the ways of the sea) adapted to naval conditions. The corps is always available for immediate use at the direction of the Secretary of the Navy acting for the President.

The Marine Corps is a military and administrative organization, complete in itself, but dependent upon the Navy for certain services such as medical, surgical, dental, legal, etc. The corps has its own staff and line officers.

The commanding officer of the Marine Corps is the Major General Commandant. There have been fifteen commandants of the corps. The *Navy Regulations* provide that the commandant shall be stationed at the headquarters of the Marine Corps, Washington, D.C., and shall be responsible to the Secretary of the Navy for the general efficiency and discipline of the corps. The Major General Commandant has under his immediate jurisdiction and control his three staff officers—the adjutant and inspector, the quartermaster, and the paymaster—who correspond closely to the bureau chiefs of the Army and Navy. There is also a general officer carrying the title of assistant to the commandant, who aids the Major General Commandant in coördinating all the business transacted at headquarters. At present Brigadier General John T. Myers is filling that office. With the exceptions noted above, the Marine Corps is an organization of the naval service, complete in itself and functioning as such. History shows, and experience has taught, that the Marine Corps in its present status and under the present jurisdiction performs efficiently for the nation.

From July 11, 1798, the date that President John Adams signed the Act of Congress that brought the present Marine Corps into existence, there has been a commandant and an adjutant, quartermaster, and paymaster to assist him. Starting with the first commandant, William Ward Burrows, in 1798, the military command and administrative control of the corps was vested in the commandant. From the naval appropriations bill of 1798 to that of 1930, appropriations for the Marine Corps have been made separately and not included in that for the Navy Department.

One of the principal reasons for the efficiency of the Marine Corps is that it has, in the Major-General Commandant (who is appointed by the President for a four-year term), a single head and that he not only is charged with the duty of building up its efficiency, and of conducting its affairs economically, but also is regarded by all officers and enlisted men as their natural protector and friend. In this regard it is well to remember that unity of administrative control is as essential to success as is unity of command, that both are in accord with the principle of simplicity, and that, conversely, a division of authority spells confusion, demoralization, and disaster. Another feature that conduces to efficiency is the fact that Congress has not divided the Marine Corps into subordinate units as regiments, etc. There is only one statutory organization—the corps—and that lends itself to mobility.

The *Navy Regulations* carefully prescribe the duties and functions of the Major General Commandant. Among other things these regulations provide that under the direction of the Secretary of the Navy he shall issue such orders for the movement of officers and troops, and such orders and instructions for their guidance as may from time to time be necessary; he shall make such distributions of officers and men, for duty at the several shore stations, as shall appear to him to be most advantageous for the interests of the naval service, and shall from time to time, when required by the Secretary of the Navy, furnish detachments for vessels of the Navy; he shall exercise a general supervision over all expenditures and supplies needed for the maintenance or connected with the management of the corps. It shall be his duty to see that all estimates of appropriations required for the support and employment of the corps are based upon proper considerations; he shall exercise general supervision and control over the recruiting service of the corps, and over the necessary expenses thereof, including the establishment of recruiting offices, and shall, from time to time, according to the necessities of the service, detail officers and men therefor; and he shall report annually to the Secretary of the Navy the condition and wants of the corps, together with the necessary estimates, in duplicate, of appropriations required for its support. All important correspondence concerning the Marine Corps passes through the Major General Commandant. He is a member of the General Board of the Navy.

Navy chaplains and medical and dental officers of the Navy are detailed to serve with the marines.

Legal matters of the Marine Corps are handled by the Judge Advocate General of the Navy. Marine officers, however, are detailed to serve in the office of the Judge Advocate General. With reference to the discipline of the corps, *Navy Regulations* provide that the records of all general courts-martial and courts of inquiry involving the personnel of the Marine Corps shall, before final action, be referred to the Major General Commandant for comment as to disciplinary features.

The aids-de-camp to the Major General Commandant assist the Major General Commandant in the manner indicated by their title. They are stationed in his office and take care of appointment for, and reception of, visitors to the Major General Commandant. They are in charge of the Marine Band and of the Navy Building Marine Guard.

The administrative work of Marine Corps Headquarters is distributed among: the office of the assistant to the Major General Commandant; the department of the adjutant and inspector; the department of the paymaster; and the department of the quartermaster.

While obviously the Major General Commandant has command of his three staff officers, nevertheless, the *Navy Regulations* provide that he shall have immediate command of the officers composing the staff of the corps, who shall perform their duties under his direction.

While the Marine Corps is a semi-independent organization and not a bureau or office of the Navy Department, nevertheless it is not independent in the same sense that the Army and Navy are of each other.

The *Revised Statutes* provide that

> the Marine Corps shall at all times be subject to the laws and regulations established for the government of the Navy, except when detached for service with the Army by orders of the President; and when so detached they shall be subject to the rules and articles of war prescribed for the government of the Army.

While serving with the Army as provided in this law just quoted, the Marine Corps is as much a part of the Army as is the Army itself. Instances of service with the Army are: at the Battle of Princeton in the Revolution; the Battle of Bladensburg and Battle of New Orleans in the Second War with Great Britain; in the Florida Indian wars of 1836 and 1837, when the Commandant of Marines himself commanded the "Fighting Brigade" of the Army of the South; at the capture of Vera Cruz, Chapultepec, and Mexico City in the Mexican War; at the first Battle of Bull Run in the Civil War; in the Army of Cuban Pacification, 1906-1909; in Mexico in 1914; and in the American Expeditionary Forces in France, Belgium, Luxemburg, and Germany.

The Act of July 11, 1798, which authorized the present Marine Corps, specified the duties of the corps and with but slight change in phraseology these duties are outlined today in the *Revised Statutes.* The law in effect today provides that

> Marines may be detached for service on board the armed vessels of the United States, and the President may detach and appoint for service on said vessels such of the officers of said corps as he may deem necessary. . . . . the Marine Corps shall be liable to do duty in the forts and garrisons of the United States on the seacoast or any other duty on shore, as the President, at his discretion, may direct.

Both the original Act of 1798 and the present law provide that the

> Corps may be formed into as many companies or detachments as the President of the United States shall direct, with a proper distribution of the commissioned and noncommissioned officers and musicians to each company or detachment.

From these provisions of law it will be observed that the Marine Corps comes directly under the Secretary of the Navy acting for the President.

Under the above provisions of law the Secretary of the Navy prescribes the duties to be performed by the marines. These are set forth in *Navy Regulations,* general orders, and outlines of the General Board approved by the Secretary.

The mission of the corps has two distinct phases—war and peace. The marines have participated in every real war in which their country has been engaged—the Revolution (1775-1783), French Naval War (1798-1801), war with Algiers (1815), war with West Indian Pirates (1818-1830), war with Florida Indians (1835-1842), Mexican War (1846-1848), Civil War (1861-1865), war with Spain (1898), Chinese Boxer War (1900), Philippine Insurrection (1899-1904), and World War (1917-1918).

Headquarters and Marine Corps schools are continuously carrying out plans to have the corps fully prepared for any future major war, in which the general function of the corps would be, as an adjunct of the Navy, to provide and maintain forces for land operations in support of the fleet for the initial seizure and defense of advanced bases and for such limited auxiliary land operations as are essential to the prosecution of the naval campaign.

While the wars already mentioned and numerous minor wars in the South Seas, East Indies, West Indies, China, Japan, Corea, Formosa, Cuba, Porto Rico, Santo Domingo, Haiti, Africa, Mexico, Nicaragua, Panama, and Samoa, have afforded the Marine Corps unequaled opportunities to prove its superiority as a combat organization, it is during peace time that the marines have been wonderfully productive—paying dividends to their country and to humanity.

Butting into the other fellow's quarrel is always a dangerous and thankless job, but the marines have been acting as a mail-fisted peacemaker ever since they took over the job in 1775.

Preserving the peace and required often to turn the other cheek; succoring little bits of civilization that have dotted the undeveloped spaces of the world; garrisoning the outposts of our democratic empire; relieving the suffering caused by earthquakes, fires, and other catastrophes, at home and in foreign parts; participating in the opening of the doors of the exclusive Asiatic states—Japan, China, Siam, and Corea—to Western influence; rendering aid in the prevention of illegal slave trade; functioning

as an international police force in every clime; training national guards, as in Haiti, Santo Domingo, Nicaragua, and Samoa; making maps; on the spot upon the acquisition of new territory by the United States —Louisiana, Florida, Alaska, California, Samoa, Midway, Hawaiian Islands, Guam, Philippines, Porto Rico, Virgin Islands; road makers; bridge builders; always available to assist municipal police at home and abroad; guards of honor at national and international expositions; attachés in Latin-America; guards for assassins of presidents; guards at peace and armament conferences (Washington in 1922 and London in 1930); personal guards for our Presidents; guards at Presidents' camps; occupying forces for those near-by states over which the United States has elected itself guardian; participating in exploring expeditions—as the *Darien* and those of Admiral Byrd to the poles; protecting seal fisheries—as in Alaskan waters; protecting cable employees—as on Midway Island; maintaining quarantine camps; protecting diplomatic missions as Abyssinia in 1904; relieving famine sufferers in China; administration of foreign states; guarding the United States mails; carrying mail, express, freight, and passengers by airplanes in China, Nicaragua, and Santo Domingo; fighters of pirates as in Haiti, Tripoli, Marquesas Islands, Barataria, West Indies, Porto Rico, Cuba, Santo Domingo, Sumatra, China, and Formosa; makers of real citizens for America—all these and more. The American marines are real missionaries who have spread the gospel of democratic ideals throughout the world.

The marines have had considerable service on duty with international police parties—in Japan in the sixties; China from 1842 to 1860; Hawaiian Islands in 1874; Alexandria, Egypt, in 1882; during the Chinese-Japanese War in 1894 when a large international force landed at Tientsin; Nicaragua in 1894; Samoa in 1899; Chinese Boxer War in 1900; Haiti in 1914, and finally the World War in 1917-1918. In 1919, a battalion of marines serving in France was selected to serve as part of the international force organized for the purpose of conducting the plebiscite in Schleswig-Holstein, but owing to the non-participation of the United States the marines were not used for this purpose.

And today, what are the marines doing? When they aren't fighting, they're working. That's the answer. Economy being the god of the day, the marines do not wait for orders, but immediately make the required weight. This, however, does not weaken their efforts, or serve as an excuse for a cessation of accomplishments, for no period of Marine Corps history is more fruitful of constructive results than the present.

The marines are serving as what might be called a colonial army, in China (Peiping, Tientsin, and Shanghai), Philippines, Guam, Hawaiian Islands, Panama, Haiti, Virgin Islands, Nicaragua, and Cuba. One general officer is the personal representative of the President and high commissioner in Haiti. One officer is an attaché at Tegucigalpa, Honduras.

At home, in our overseas possessions and dependencies, and in foreign countries the marines are ready to assist the municipal police in the prevention of crime, maintenance of order at fires, and the putting down of riots, etc. Twice they have been called upon to guard the mails (1921 and 1926), and, though this required tact and a high degree of intelligence, the duty was performed to the complete satisfaction of the President and Postmaster General.

The Third Brigade went to China in 1927-1929 and completed its mission admirably without firing a shot, while the Second Brigade in Nicaragua (1927-1930) had to battle bandits and many marines gallantly gave up their lives that the brigade's mission might be fulfilled.

They are serving on thirty-six battleships, cruisers, and airplane carriers of the Navy that are distributed all over the globe, and this duty requires an instant readiness to land for any purpose from rescuing an American citizen from an irate mob ashore to fighting a fire at the request of the local authorities. They are serving in the United States at practically every place that there is a naval activity.

There is the closest kind of liaison and coöperation between Marine Corps Headquarters, Chief of Naval Operations, the bureaus, and other offices of the Navy Department. There is no friction and the Marine Corps machine functions in high gear without any serious jolts or jars. The Marine Corps is working for the general upbuilding and welfare of the entire naval establishment.

The New American Merchant Marine

By T. V. O'Connor
Chairman, U. S. Shipping Board

THE importance of a strong merchant fleet as an adjunct to the Navy is so well understood that naval officers and others interested in national defense will be gratified to learn of the success which is beginning to crown the Shipping Board's efforts to create a new American merchant marine.

It is a matter of common knowledge that lack of merchant ships seriously handicapped our naval and military efforts in the Spanish War, and again in the World War. Our war-time shipbuilding program, undertaken with a view to developing an emergency fleet for war purposes, gave us a vast amount of tonnage, some of which has proved very serviceable, while other units have been found to be not at all adapted to present requirements. After the war we used part of this tonnage to establish regular steamship services on some of the more important trade-routes, and as soon as these services were developed to the point where they proved attractive to American investors they have been sold to private interests. The lines so disposed of, together with those still remaining in the Board's possession, constitute the foundation on which we are building up the new American merchant marine.

In transferring the government's war-built tonnage to private ownership, the Shipping Board has not been unmindful of the difficulties that confront American shipowners when competing with foreigners, and has been less concerned with the actual prices in dollars secured for its ships than with the larger consideration of obtaining reasonable assurance that the private owners will be able to carry on successfully for a number of years. Because of the greater construction and operating costs of American ships, as compared with similar costs under foreign flags, Congress has acted in the interest of the private owner by taking steps to remove, or at least to mitigate, these burdensome differentials, and thus lessen the financial handicaps under which American shipowners have labored in the past. As a result of the interest displayed by Congress in these important matters, we now have on the statute books two all-important provisions—one relating to ocean mail contracts, the other to construction loans—which together are rapidly bringing about great changes in the evolution of the merchant marine. It is my purpose to point out very briefly the results thus far achieved.

The mail contract provisions of the Merchant Marine Act of 1928 have furnished the chief stimulus for the gratifying activity which is today being manifested in all branches of the shipping industry. Ocean mail contracts have already been awarded, or are in process of award, on forty-one routes. According to the terms of the contracts, the various operating lines are required to build a total of sixty-eight new and modern ships, aggregating approximately 700,000 gross tons, and costing in the neighborhood of $277,000,000. Furthermore, the majority of these vessels will be launched within the next five years. Contracts have already been let for the construction of twenty-nine of these ships, totaling approximately 265,000 tons, at a cost of $88,274,470. Indeed, thirteen of the twenty-nine are under construction at this writing and three have actually been delivered. As a result of these developments American shipyards are again enjoying a period of great activity.

Under a wise provision of the law, the Secretary of the Navy approves the plans and specifications of these new ships, with particular reference to their economical conversion into auxiliary naval vessels in time of national emergency. It is interesting to note that of the sixty-eight ships required under mail contracts thus far awarded, eight

will have a speed of thirteen knots, twelve a speed of fourteen knots, two a speed of fifteen knots, twenty-three a speed of sixteen knots, thirteen a speed of eighteen knots, eight a speed of twenty knots, and two a speed of twenty-eight knots. All will be serviceable in time of emergency, either as transports, supply ships, or unarmored cruisers.

Supplementing the operating aids afforded by ocean mail contracts are the loans granted to American citizens from the construction loan fund, originally authorized by the Merchant Marine Act of 1920, and since made a revolving fund of $250,000,000. Loans from this fund are made on liberal terms for new ship construction and for the reconditioning of ships already built. Since the fund was first established loans have been authorized amounting to a total of $162,380,372, involving work on sixty-nine vessels. While the low rates of interest and easy terms of repayment combine to make this service one of great value to American shipping, it can by no means be said that the construction differential is wiped out thereby. Because of higher costs of labor and material in this country, compared with the cost of these items in other maritime nations, a considerable differential will probably always exist. It is clear that it will have to be met by improved construction methods—perhaps involving standardization of types and parts—or else be absorbed in the revenues derived from operation.

At the same time that the Shipping Board has been working along the constructive lines above indicated, it has been exerting its best efforts to liquidate the government's emergency fleet, in accordance with the policy laid down by Congress whereby it was provided that these war-built vessels were to be transferred, as soon as practicable, consistent with good business methods, to private American ownership. So far has this liquidation program progressed that out of a grand total of 2,546 vessels of all sorts which have been owned by the board at one time or another, only 420 vessels remain in its possession today. Many of the ships sold have gone to build up our wonderful coastwise service, while others are being operated in the foreign trade of the United States by private American interests.

Of the thirty-eight foreign trade services operated by the Shipping Board several years ago, only sixteen lines now remain unsold. It is expected that within the next year this number will be further reduced to six lines. Meanwhile there is being put into effect a new form of operating agreement which will materially assist in reducing the budget for the next fiscal year, the prepared estimates showing that only $4,000,000 will be required for 1931-32, as compared with $10,000,000 in 1929-30 and $6,000,000 in 1930-31. It is patent that the new American merchant marine will be privately owned and operated, the government's establishment and operation of lines having been in the nature of pioneering work, quite necessary in its place, but destined from the first to be superseded by the sounder principle of private ownership.

Coincident with the sale of ships and ship lines, the Shipping Board has effected marked retrenchment in its operating and administrative personnel, amounting to $1,376,859, or 31.8 per cent for the fiscal year ended June 30, 1930. With additional sales of lines, and with the lump-sum operating agreement placed in effect, it will be possible to make still further reductions in personnel. Our main objective, constantly borne in mind in the midst of minor distractions, is to take the Shipping Board out of the operating field altogether and have it confine its activities to its purely regulatory and promotional functions.

The new American merchant marine will be owned and operated by American citizens. It is important, too, that it should also be manned by Americans, and this is a problem that has long engaged our attention. For some years the law has required that officers of our merchant ships shall be citizens of the United States, but there has been no such requirement in the case of the crew. However, the Merchant Marine Act of 1928 provides that for a period of four years after the enactment of the act one-half of the crews of American vessels engaged in ocean mail service, and thereafter two-thirds of the crew of such ships shall be citizens of the United States.

Not only should the new American merchant marine be owned, operated, and officered by American citizens, but the greater portion of its crews, too, should be bona fide citizens of the United States if we are to count on the merchant service to play its full part in time of national emergency.

Why *the* United States Should Maintain *a* Full-Strength Treaty Navy

By WALTER BRUCE HOWE

Chairman of the Board of the Navy League of the United States

REGARDING no aspect of our national policy is there so much confusion as that of the genuine necessity for America's maintenance of a full-strength treaty navy.

The public is continually told that we do not need a large navy but no sound reason is offered for the statement.

A plausible theory and one favored by an extreme group of zealots is that we should "show the way" to less fortunate nations by American leadership and idealism. We favor naval reduction, they say, and if we fail to live up to the doctrine we advocate, how then can we expect other nations to follow our professed principles?

If the American people ever seriously entertained the idea of effective world-wide disarmament through the "reduction by example" method the experience of the past eight years should have afforded abundant disillusionment.

In 1921 the United States had a navy built and on the ways which in the opinion of many experts would have resulted in a fleet greatly superior to that of any other power. The American government renounced this supremacy and by destroying new vessels upon which had already been expended 175 millions reduced American superiority to equality in large vessels with the next great naval power.

This unprecedented act of conciliation on the altar of international amity had never before been suggested, has never since been emulated.

The year following the ratification of the treaty by which we renounced naval supremacy President Harding issued a prophetic warning to the American people:

> It is covenanted, in international honor, that our Navy shall retain the first rank, and any failure at retention must be charged to ourselves, because the world has deliberately acknowledged the righteousness of our front rank position.

The subsequent history of all national naval policies is too well known to warrant extensive comment. Restricted by agreement in larger vessels, the foreign naval powers launched upon intense programs of small ship building, while American naval construction atrophied.

A study of recent building projects shows that during the eight years between 1922 and 1930 the United States laid down three submarines, Great Britain nineteen, Japan thirty-five, France sixty-seven, and Italy thirty-two. The destroyer building of the principal powers points to a similar disparity. Since the Washington treaty the United States has laid down no destroyers; Britain twenty-two, Japan forty-seven, France forty-eight, and Italy thirty-seven. And while the various cruiser programs do not indicate such a marked discrepancy it is significant to note that from the Washington conference until the enactment of the cruiser bill in 1929 we tied for third place among the five principal naval powers in this category, the figures (representing vessels laid down) being United States eight, Great Britain fifteen, Japan fifteen, France eight, and Italy six. The passage of the fifteen-cruiser bill was considered important enough to call another conference, although that program, even had it been carried out, would not have achieved in this class of warship the ratios fixed at Washington in 1922.

Commenting upon the failure of the nations to reach an agreement regarding auxiliary building at Geneva in 1927 President Coolidge said:

It no doubt has some significance that foreign governments made agreements limiting that class of combat vessels in which we were superior, but refused limitation in the class in which they were superior. We made altogether the heaviest sacrifice in scrapping work which was already in existence. That should forever remain not only a satisfaction to ourselves, but a demonstration to others of our good faith in advocating the principle of limitation.

The record is therefore plain. In 1922 America sacrificed an existing superiority in capital ships in order to establish the principle of naval limitation. At that time Mr. Hughes, the head of the American delegation to the Washington conference, thought that the resulting treaty would "end, absolutely end, competition in naval armament." He was mistaken. Building activities were transferred to the classes of ships not limited. It is true that America, having had the greatest strength in capital ships and having been willing to scrap down to a relatively low level, obtained limitation in that category. But the example did not carry over to cruisers, destroyers, and submarines.

During the succeeding five years from 1922 to the Geneva conference of 1927, the United States, as has been shown, set a further example in moderation, laying down only eight cruisers, three submarines, and not a single destroyer. At Washington, America led from strength and achieved a partial success. At Geneva we led from weakness. The result was utter failure.

After Geneva the American Congress showed a desire to repair the waning strength of the Navy. The fifteen-cruiser bill was passed. At the London conference of 1930, therefore, our delegates could draw on the support given by potential cruisers, authorized and appropriated for. Even with these, Senator Reed, one of the American delegates at the London Naval Conference, was astonished to find how "hopelessly inferior" was the American Navy. Thus the level of limitation arrived at was not at the low mark set by American example but at the high mark set by the building in the other navies.

If the "disarmament by example" enthusiast seeks other proof, let him turn his attention to armies. The active forces of the United States rank twelfth, following those of Russia, France, China, Great Britain, Italy, Roumania, Spain, Poland, Japan, Czechoslovakia, and Yugoslavia. Even Germany, defeated and disarmed, and with a population half that of the United States, maintains a standing army of 100,000 men compared to 136,000 for our own, including the Philippine Scouts. Clearly, our example in maintaining a small army is not proving the solution of land disarmament.

Can we any longer give serious credence to a philosophy that teaches that the weak and helpless are the destined leaders of mankind? Apart from the matter of our own neglected defenses, the method does not yield results in the sphere of idealism.

If then, the voice of America is to be given weight in the councils of nations, we should maintain our Navy at reasonable strength, until such time as altruism and law shall pervade the nations of the world.

Heretofore there has been question as to the size of the Navy dictated by reason. Now the principal powers have met and agreed on definite strengths. From outside our borders no question is raised. Take parity, heaped up and flowing over, is the British advice.

From within, the same injunction is given by those public men who have been foremost in furthering the ideal of limitation of navies by international agreement.

On October 25, 1922, shortly after the signing of the Washington treaty, Mr. Hughes said:

It is essential that we maintain the relative naval strength of the United States. That, in my judgment, is the way to peace and security. It will be upon that basis that we would enter upon further conferences or make agreements for limitation, and it would be folly to undermine our position.

An unequivocal declaration for parity was made by Mr. Hoover before the London conference met and the President and the principal delegates to the conference have since assured the American people that the London Naval Treaty provides the parity which we sought.

Our presidents and delegates have been striving for naval limitation and reduction by international agreement; they have been active in the hope of promoting peace and world stability. In every conference the American position has been that we require a navy as strong as any other power.

Behind that position is an array of facts which have convinced three successive ad-

ministrations in recent years, and, indeed, led every president since Washington to urge the maintenance of our naval defense. These considerations are based on our geographical position, taken in connection with the number and wealth of our population; on the value and world-wide distribution of our trade, foreign and coastwise; on the protection of distant possessions and strategically vital positions in Hawaii and the Canal Zone; and on other national policies, of which the Monroe Doctrine, the Open Door, neutral rights, and the protection of American lives and property in unstable countries have been more or less constantly before the State Department for many years.

It must be remembered that, in the last analysis, it is the nation not the Navy that needs ships.

In point of population, the United States ranks fourth, following China, the British Empire, and Russia. In wealth, America is far out in front, having between two and three times the estimated national wealth of the whole British Empire. Geographically the position of the United States is favorable both to defense and to world trade, having a central position from which to reach Europe, Asia, and South America, as well as the lesser markets of the world. For neighbors we have rich but militarily weak countries. Nevertheless, the problem is presented of providing the defenses of two ocean fronts with one navy, which explains the vital importance of the Panama Canal to this country.

The foregoing considerations deal with coast defense. Full protection of the United States, however, cannot be secured by coast defenses alone—a point overlooked by too many of our people.

Full protection means more than repelling an invader. It means upholding the rights of Americans in their lives and property throughout the world. American interests outside the United States have reached fabulous sums. Our foreign trade last year was close to ten billion dollars, rivaling that of Great Britain. This figure will be off by perhaps as much as 20 per cent this year, due to the business depression, but much the same will be true of the trade of other countries. It seems fair to conclude that America has taken rank with Britain in foreign trade.

Nor is our foreign trade merely a profitable side issue, as it is so often represented to be. Its importance was well expressed by Mr. Hoover in his Boston address. He said:

> The expansion of export trade has a vital importance in still another direction. The goods which we export contribute to the purchase from foreign countries of the goods and raw materials which we cannot ourselves produce. We might survive as a nation although on lower living standards and wages, if we have to suppress the 9 per cent or 10 per cent of our total production which is now sold abroad. But our whole standard of life would be paralyzed and much of the joy of living destroyed if we were denied sufficient imports.
>
> Without continued interchange of tropical products with those of the temperate zone, whole sections of the world, including our own country, must stagnate and degenerate in civilization. We could not run an automobile, we could not operate a dynamo or use a telephone were we without imported raw materials from the tropics. In fact, the whole structure of our advancing civilization would crumble and the great mass of mankind would travel backward if the foreign trade of the world were to cease.

A brief study of the trade chart reproduced elsewhere in this issue will show that over 90 per cent of this foreign trade, so essential to our prosperity and high standard of living, could be interrupted at the far end without the enemy having to come within a thousand miles of the United States. The remaining water-borne trade with near-by countries and nearly six billion dollars in coastwise and intercoastal trade, also, require naval protection.

It is interesting to note that, whereas it would be more difficult for America to defend the bulk of its foreign trade than it would be for certain other nations to attack it, the reverse is true of the trade of Great Britain and Japan in relation to the United States. That is, three-quarters of the trade of those countries is virtually invulnerable to American attack. That is because of the large proportion of British trade with near-by Europe and through the Mediterranean, and of Japanese trade with near-by Asia and through the Indian Ocean.

The ocean-borne trade, foreign and coastwise, amounting to approximately fifteen billion dollars in 1929; a growing merchant marine of five and a half million tons employed in foreign shipping; American investments and governmental loans abroad totaling twenty-five billion dollars, are reminders of the financial stake of our people on and

beyond the seas. Statecraft is the first line of defense of these vast interests, but should statecraft fail, as it has sometimes failed in the past, the Navy becomes the principal remaining defender of American interests abroad.

Of the traditional foreign policies of our government, little need be said. None of them which have led to war or to a show of force in the past has been abandoned. The Kellogg Pact, it is true, has been signed by practically all the nations of the world, renouncing force as an instrument of national policy, but numerous interpretations and reservations modify its language, and time will be required to prove its efficacy. The attitude of the powers at the London Naval Conference shows that their chief reliance for security is still placed in their military defenses. Japan demanded and obtained an increase in its proportionate naval strength. Great Britain, we have been told, was prepared to break off negotiations rather than yield on a matter of three 8-inch gun cruisers. France demanded a navy superior to that of Italy and Italy demanded parity with France. Failing to agree, these two countries did not sign the most important section of the London Naval Treaty. In the meantime, the armies of the world approach the 1914 footing. The Kellogg Pact may prove of great value, but no serious student pretends that it affords either a guarantee of peace or an assurance of national safety.

Much has been said of the cost of the Navy. In point of fact it is the least expensive defense the nation can obtain. The Navy, with its highly efficient air arm, maintained at the treaty level will give assurance that no hostile force will put foot on our soil; will fortify the voice of America speaking for justice and law in the councils of the world; will insure respect for the lives and property of Americans throughout the earth. In so doing, it withdraws a minimum of man power from productive enterprise, renders it unnecessary to maintain a large standing army and returns a great part of its cost in trained personnel and in scientific advances. The cost of the Navy to the average citizen has been less than three dollars a year.

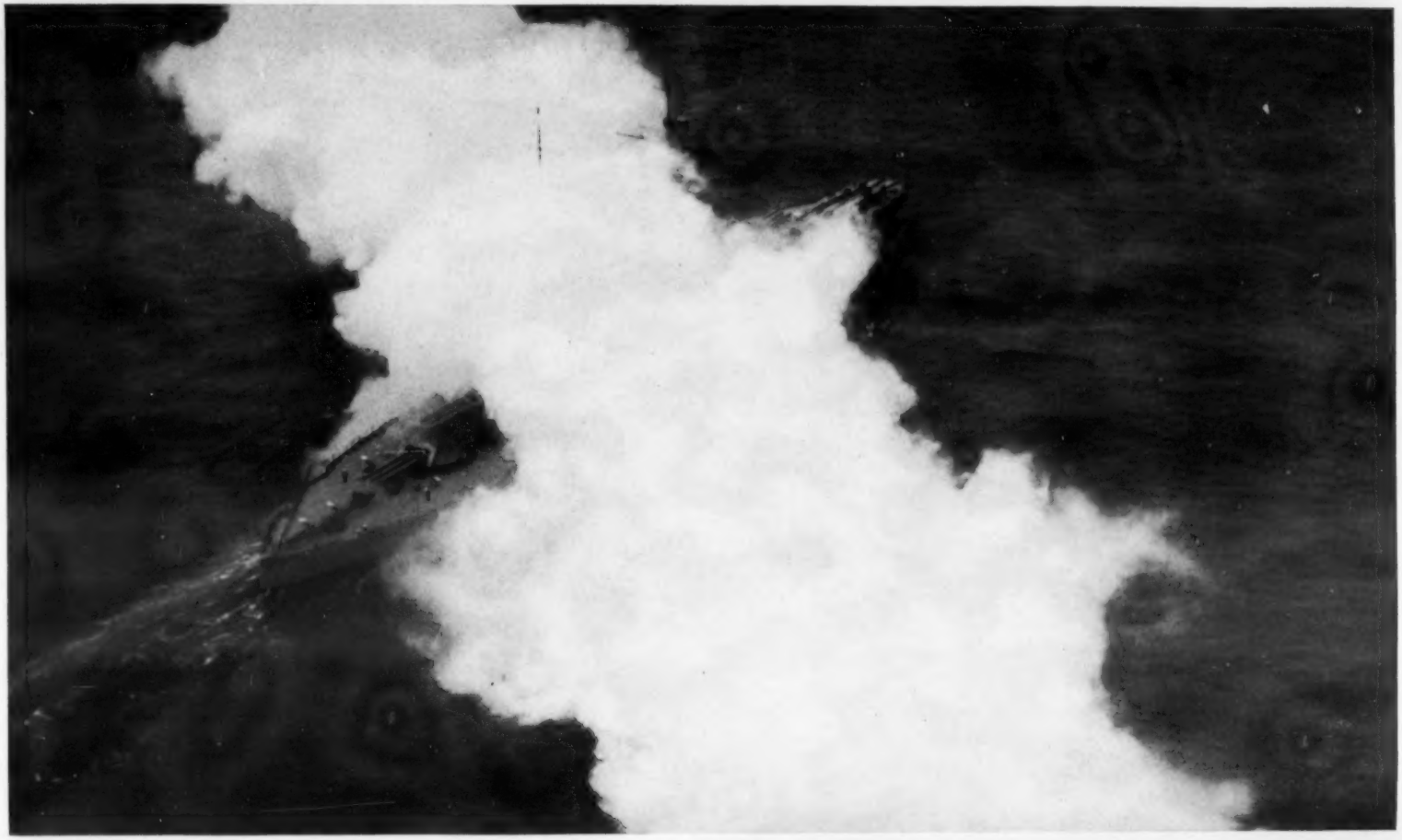
In urging the maintenance of a full-treaty navy, it is not necessary to advocate laying down every last keel permitted at the earliest possible date. Since it takes two or three years and often more to build even destroyers and submarines in orderly peacetime programs in this country, and since the London Naval Treaty expires at the end of 1936, a program of building every ton permitted when permitted would mean that the United States would have to lay down 400,000 tons in the space of the next three years. Such a course would require rapid expansion of shipyard personnel, repeat the building "hump" created by war-time destroyer and submarine building, and for some years to come, would leave no tonnage in which to incorporate mechanical advances as they are made.

Rather it would seem to be advisable to proceed promptly with the 8-inch gun cruisers permitted, because of our deficiency in that type, and with a considerable amount of destroyer and submarine replacements, with a view to arriving at an orderly program which can be carried out without hiring a great many shipyard workmen one year and firing them the next. The goal, however, should be a full-strength treaty navy within a reasonable time.

The right to protect our coast, our commerce, and our citizens is recognized by other nations. Our own citizens hold the conviction that it is the duty of our government to afford that protection, required as it is by the Constitution and by the self-interest of our whole community and of each individual. It seems clear, but nevertheless there is need to remind ourselves that security and peace depend on the maintenance of an equilibrium between the requirements of national protection and the means of securing it.

Courtesy Bureau of Aëronautics, Navy Department

A SMOKE SCREEN LAID BY AN AIRPLANE



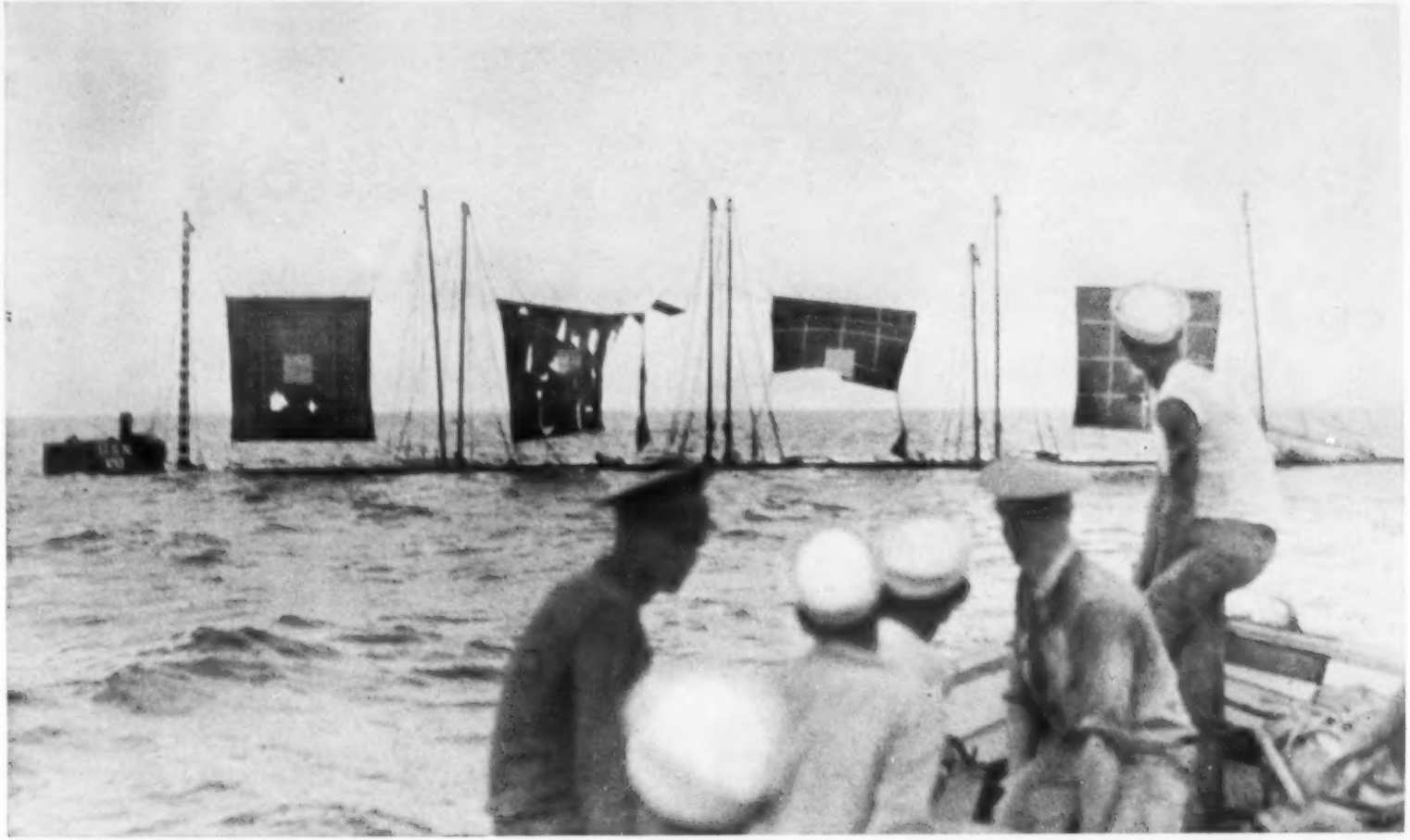
Courtesy Office of Naval Intelligence, Navy Department

BATTLESHIP EMERGING FROM BEHIND A SMOKE SCREEN

BATTLESHIP EMERGING FROM BEHIND A SMOKE SCREEN

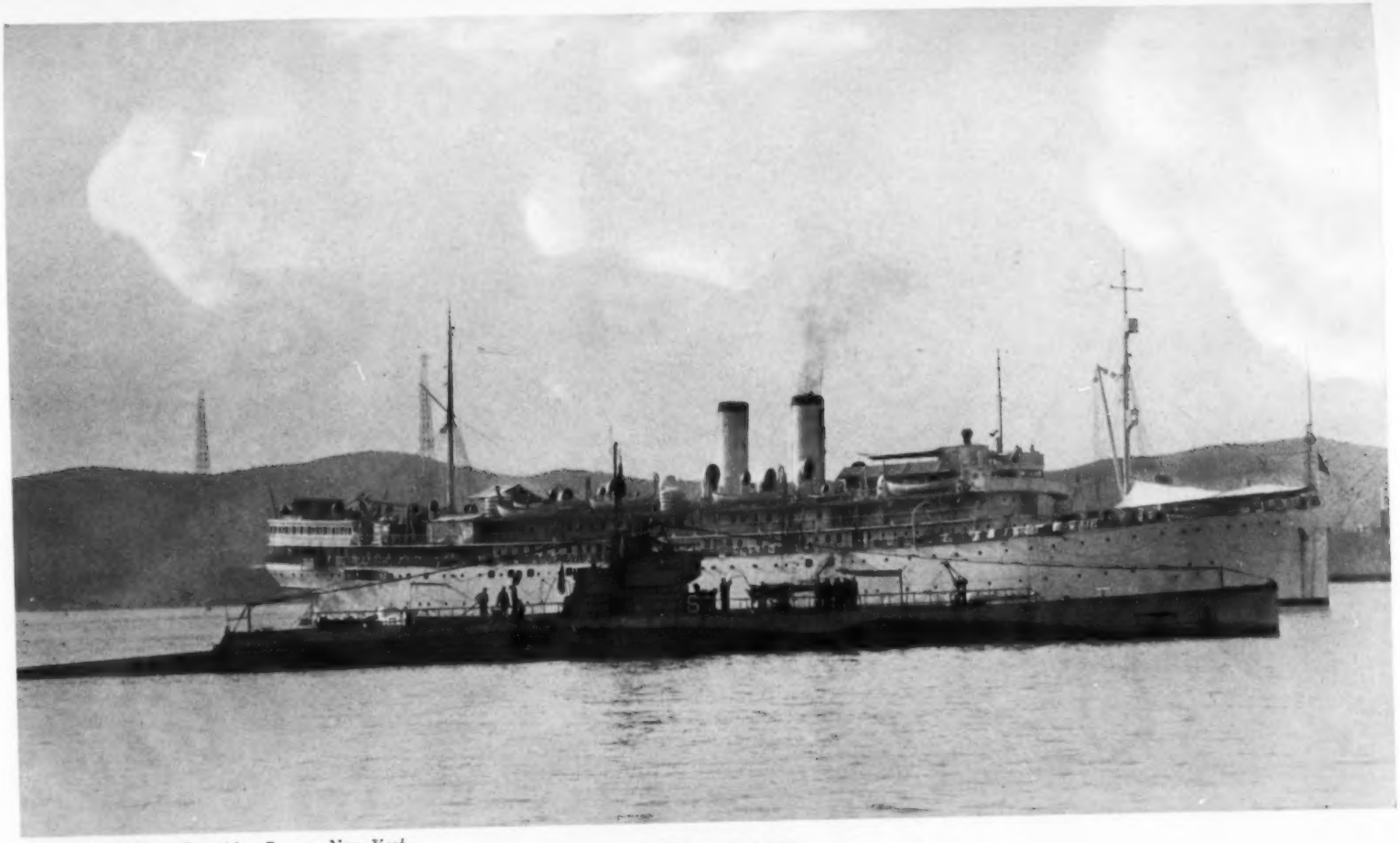
Courtesy U. S. Navy Recruiting Bureau, New York

MAKING REPAIRS TO THE PROPELLER



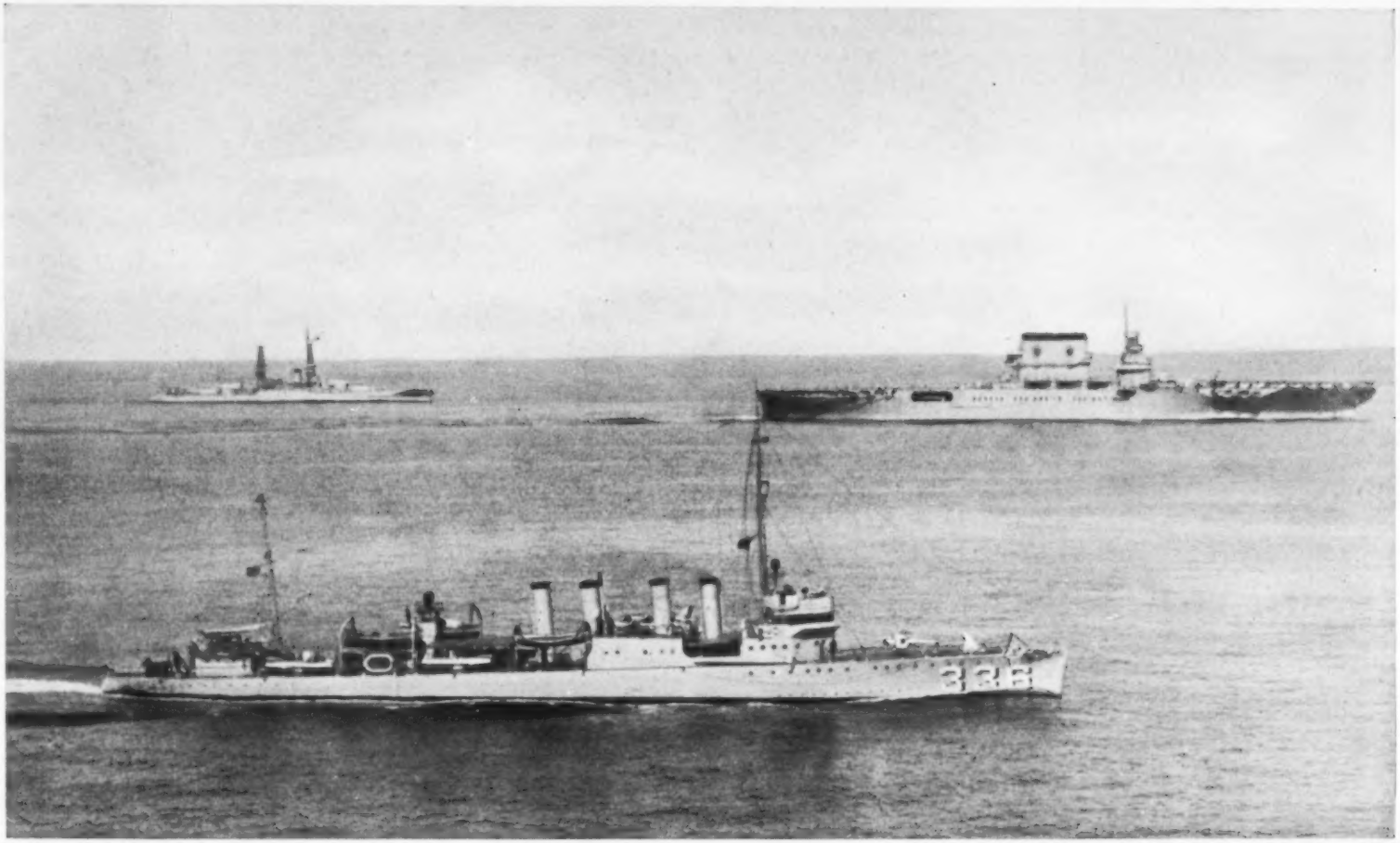
Courtesy U. S. Navy Recruiting Bureau, New York

GOOD SHOOTING!



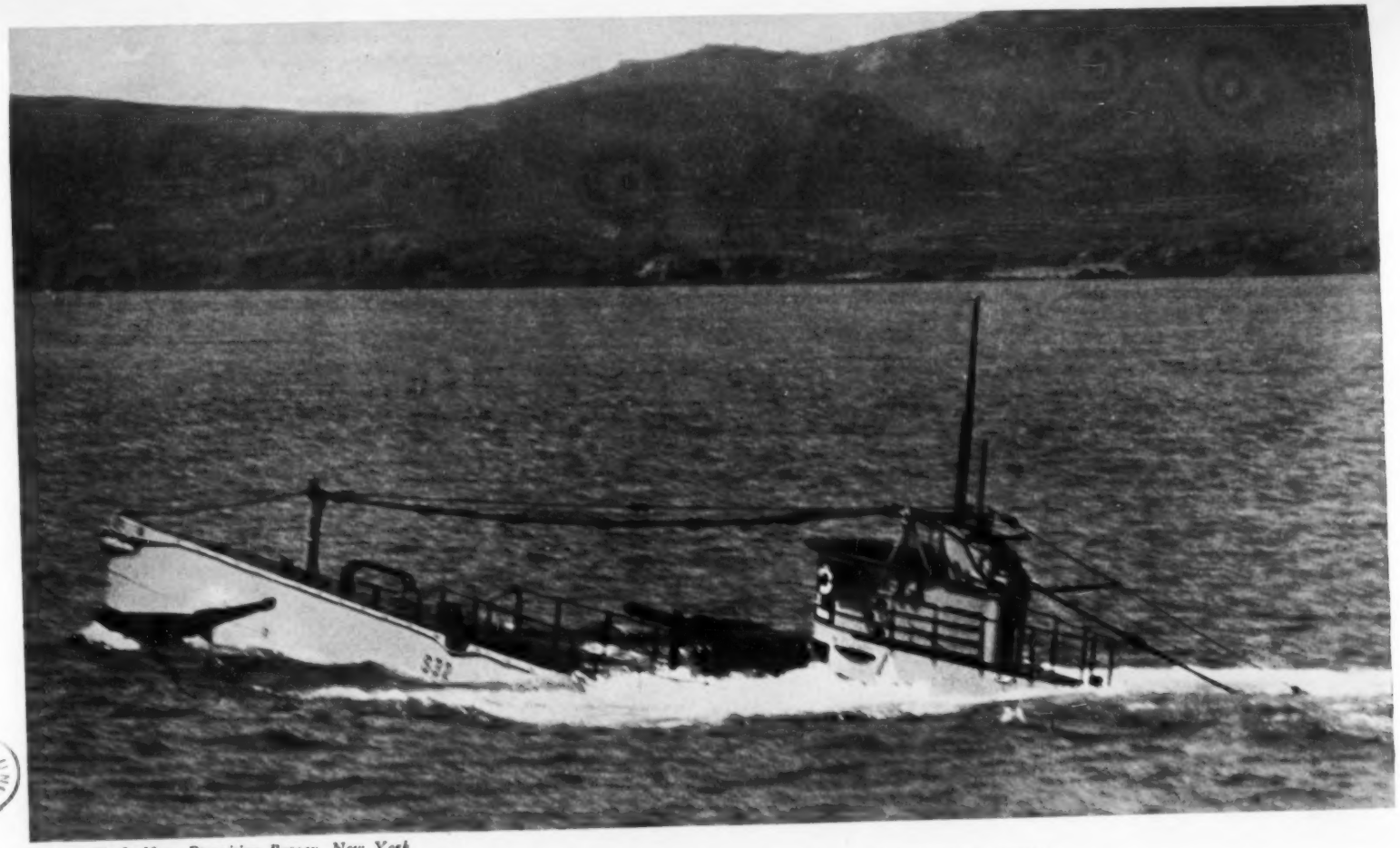
Courtesy U. S. Navy Recruiting Bureau, New York

S TYPE SUBMARINE
U.S.S. *Mercy*, hospital ship, in the background



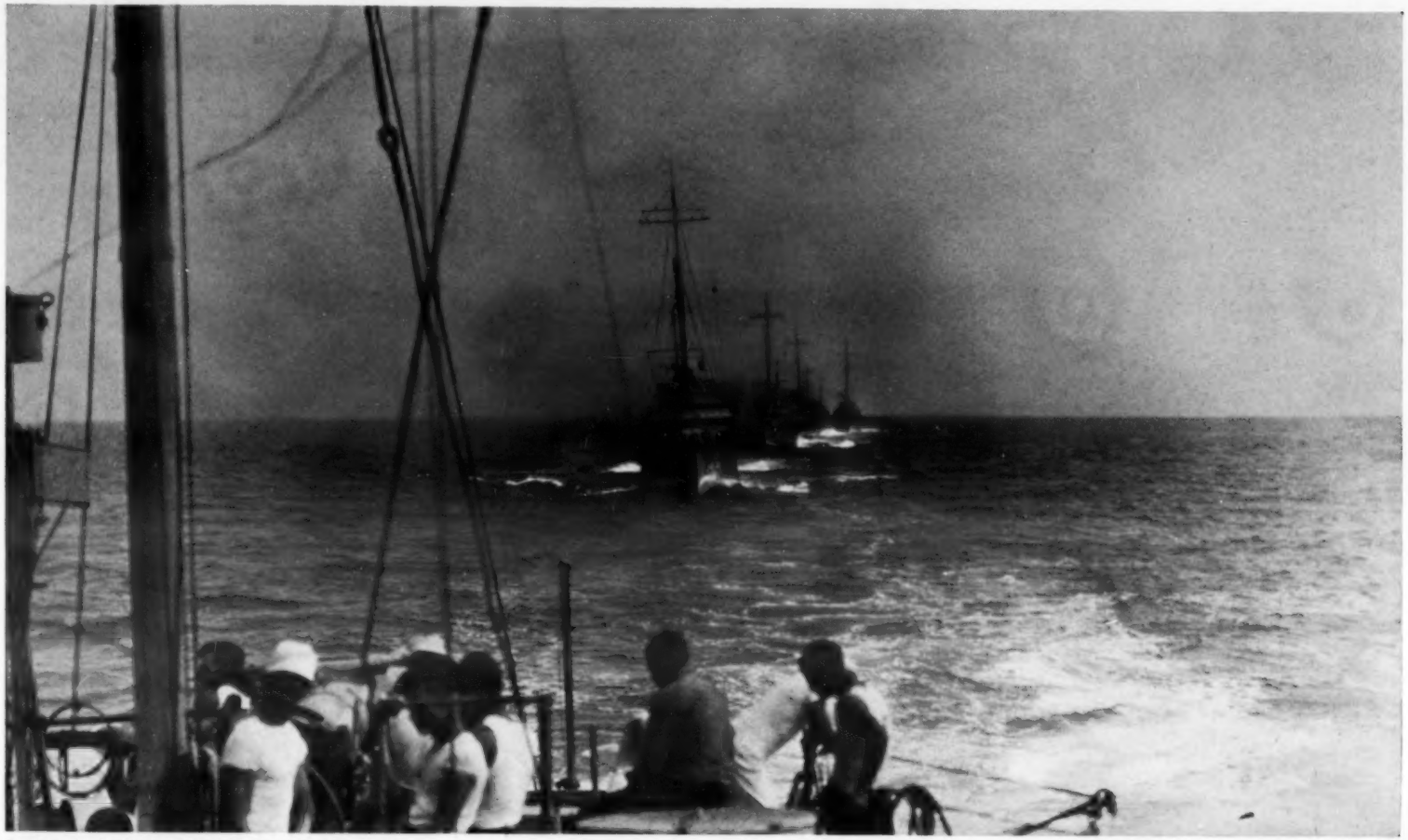
Courtesy U. S. Navy Recruiting Bureau, New York

STRONG ARMS OF THE FLEET



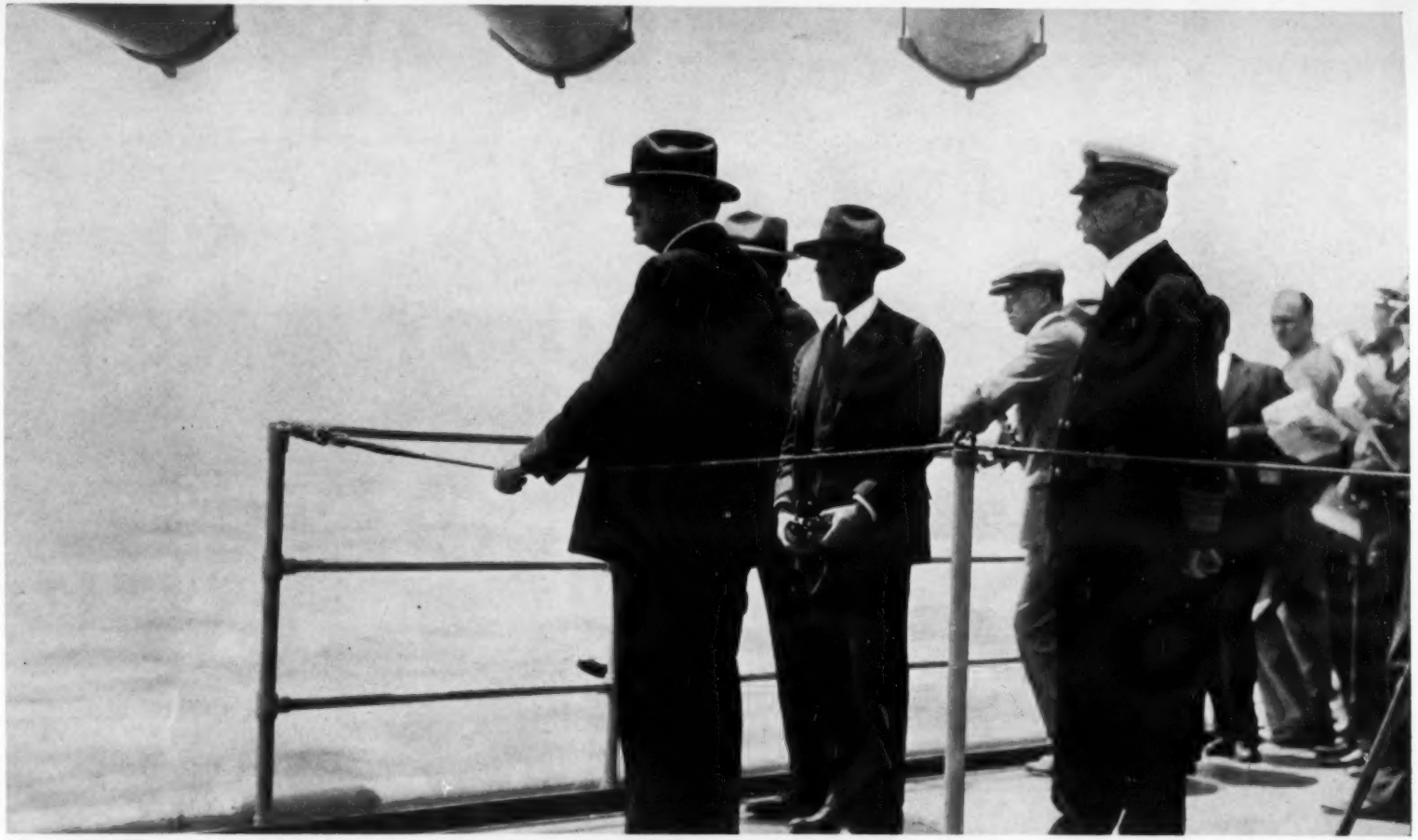
Courtesy U. S. Navy Recruiting Bureau, New York

U.S.S. *S-32* COMING TO THE SURFACE AFTER A DIVE AT TSINGTAO, CHINA



Courtesy U. S. Navy Recruiting Bureau, New York

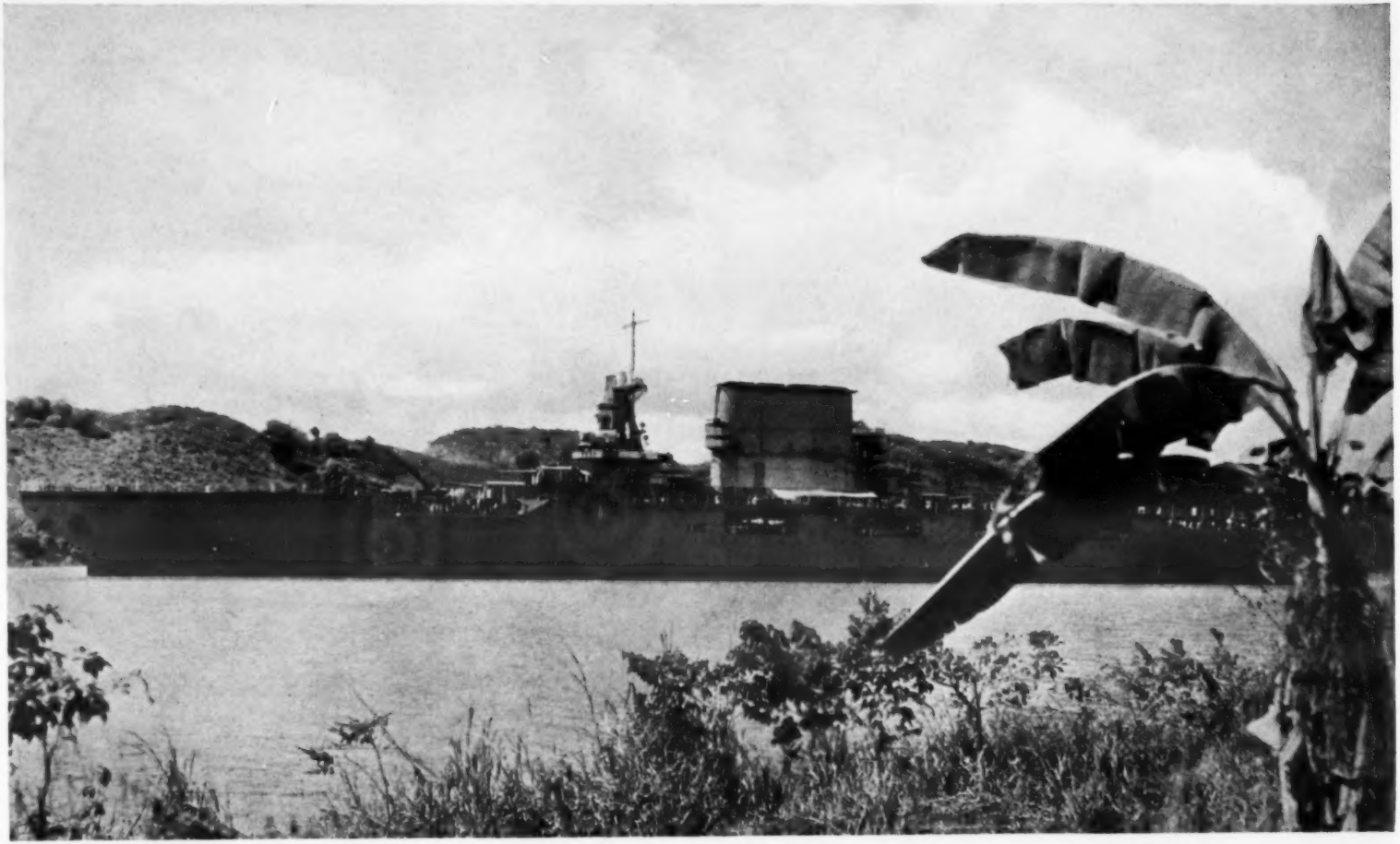
DESTROYERS IN COLUMN



Courtesy U. S. Navy Recruiting Bureau, New York

THE COMMANDER IN CHIEF OF THE ARMY AND NAVY, PRESIDENT HOOVER, THE SECRETARY OF THE NAVY, MR. ADAMS, AND THE CHIEF OF NAVAL OPERATIONS, ADMIRAL HUGHES, OBSERVING MANEUVERS DURING THE PRESIDENTIAL REVIEW AT HAMPTON ROADS, VIRGINIA

U.S. NAVAL ACADEMY



Courtesy U. S. Navy Recruiting Bureau, New York

U.S.S. *SARATOGA* PASSING THROUGH PANAMA CANAL

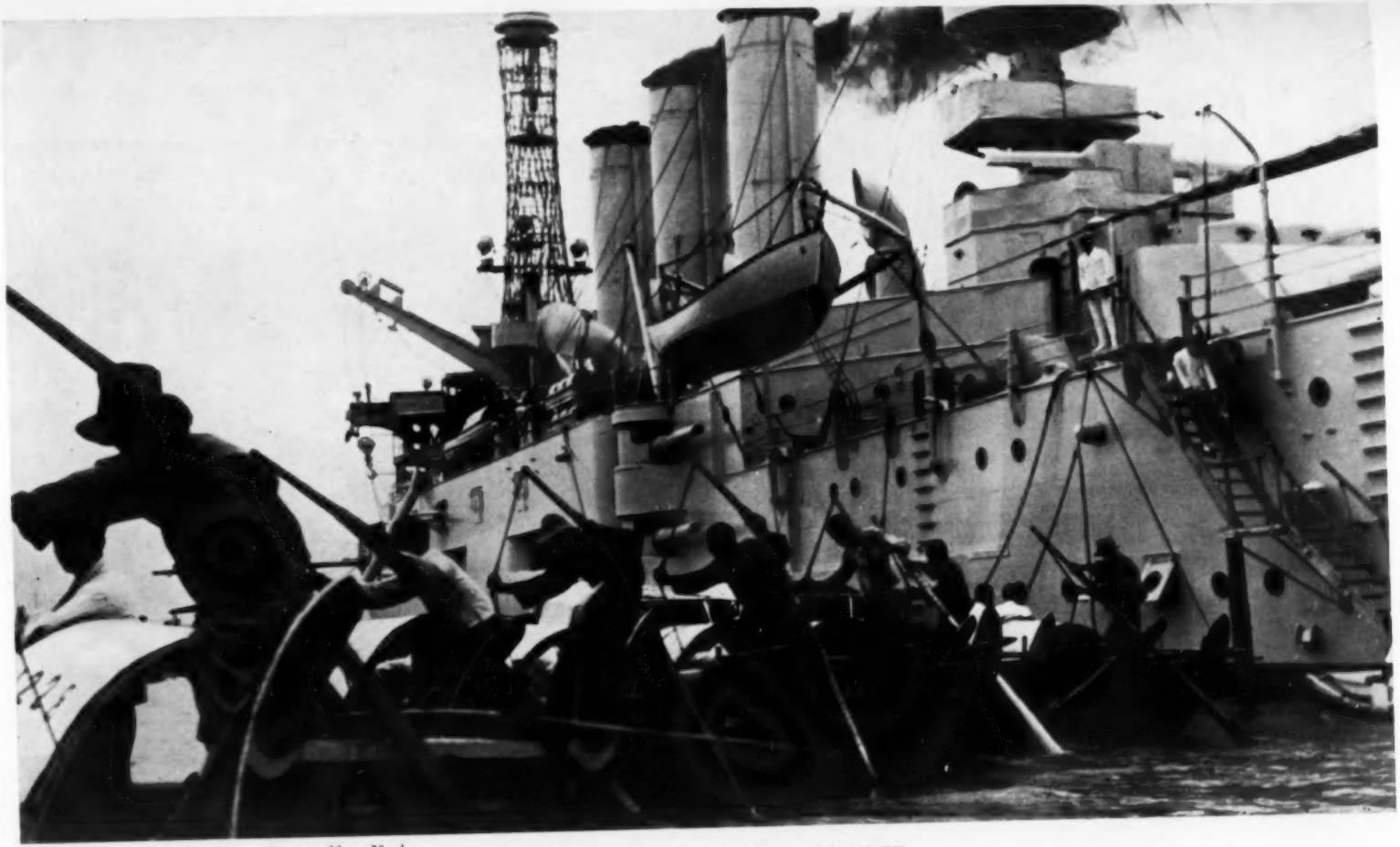
UNIV. OF MICH.

Courtesy U. S. Navy Recruiting Bureau, New York

U.S.S. *V-4* PASSING THROUGH CULEBRA CUT, PANAMA CANAL

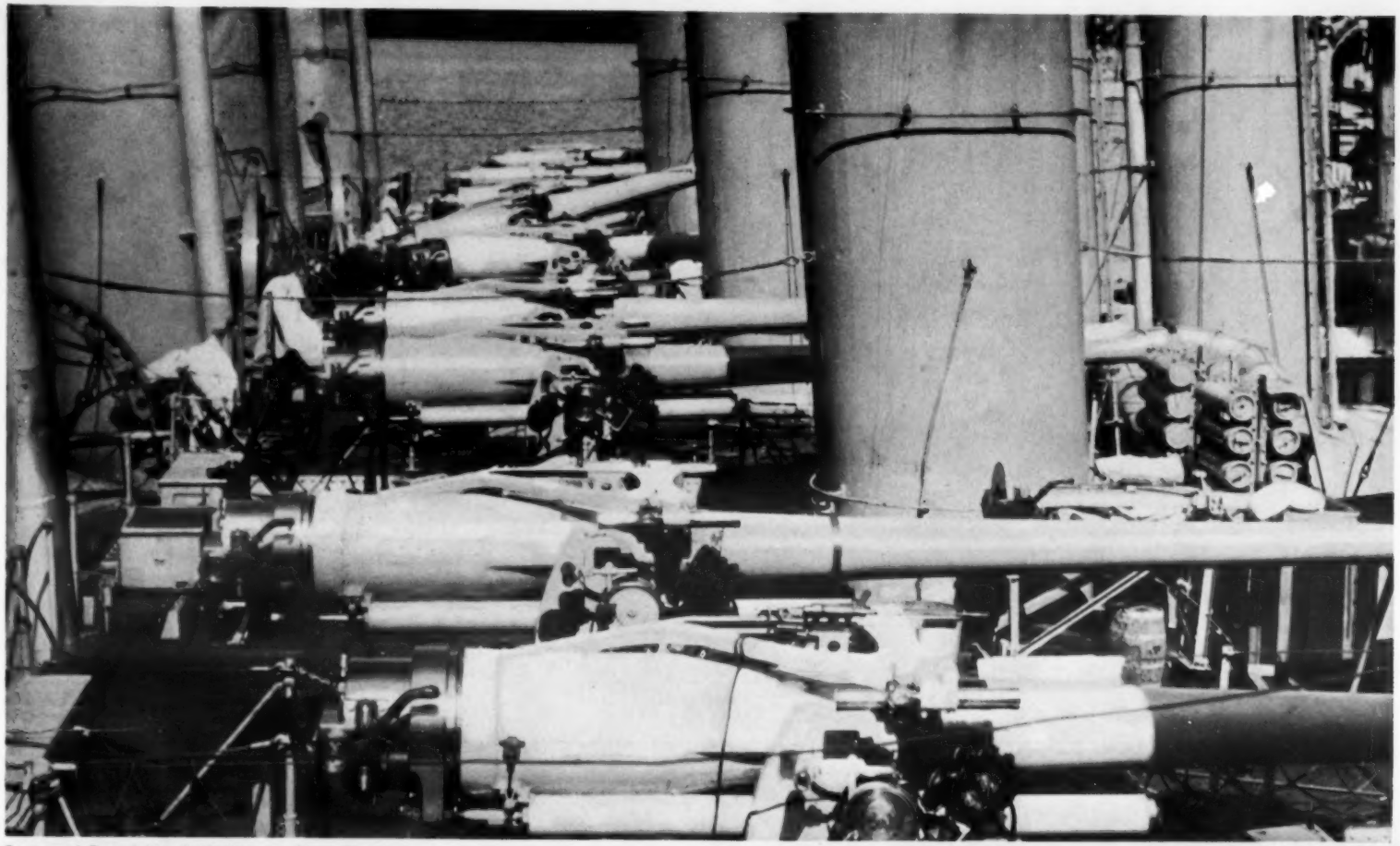
Courtesy U. S. Navy Recruiting Bureau, New York

BATTLESHIPS OF THE BATTLE FLEET IN FORMATION



Courtesy U. S. Navy Recruiting Bureau, New York

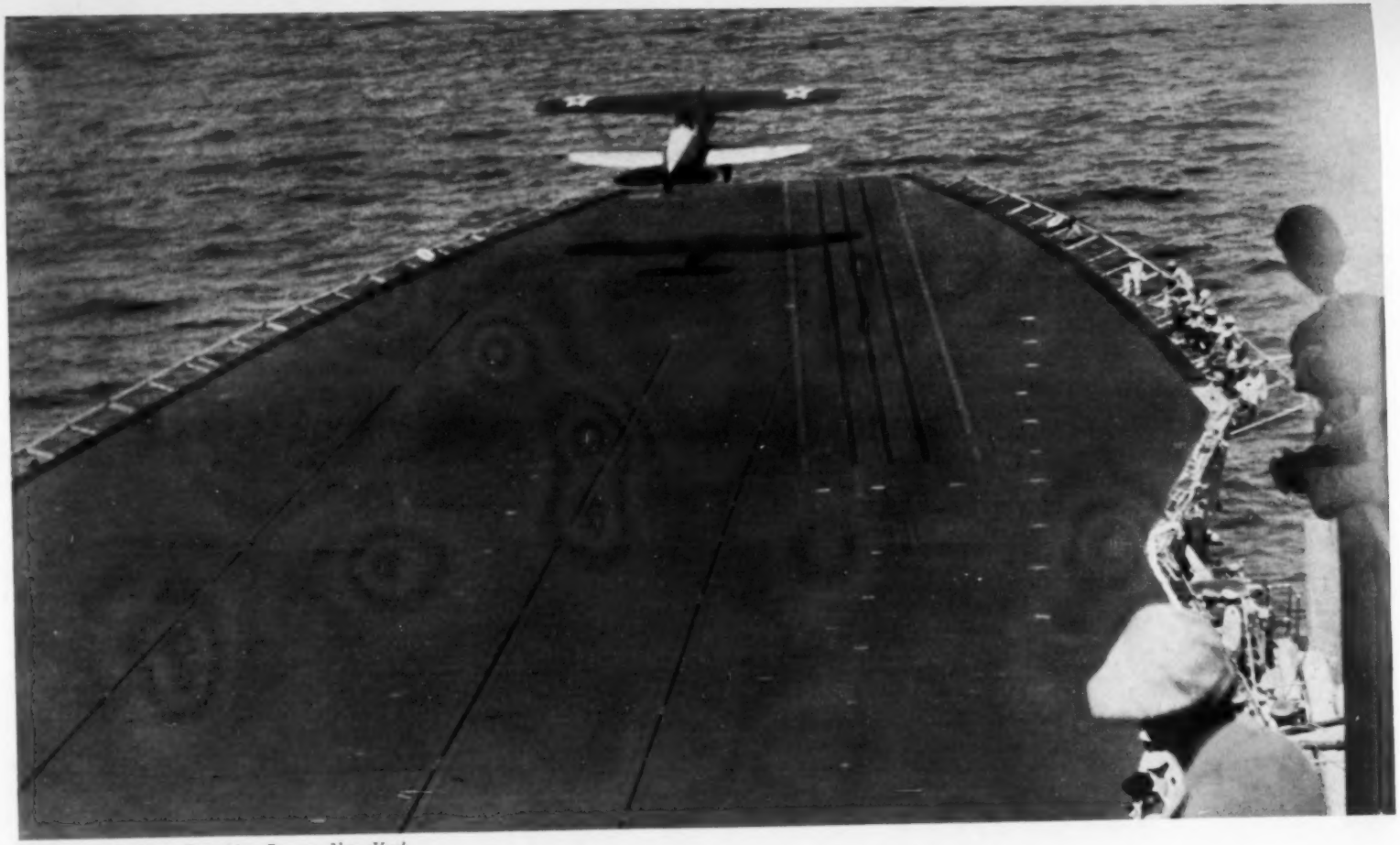
CHINESE LAUNDRYMEN COMING ALONGSIDE



Courtesy Office of Naval Intelligence, Navy Department

DESTROYERS MOORED TOGETHER

DESTROYERS MOORED TOGETHER

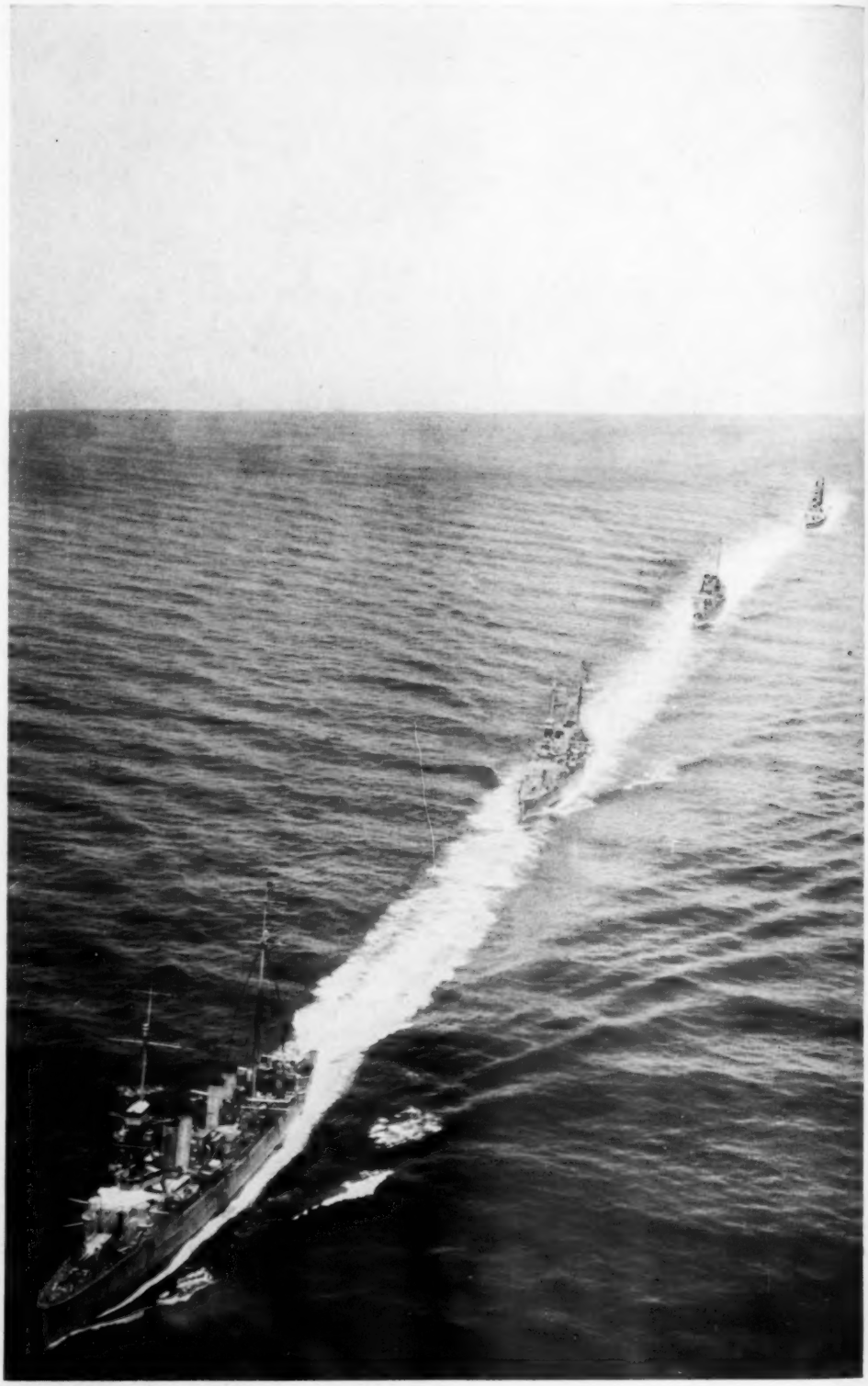


Courtesy U. S. Navy Recruiting Bureau, New York

TAKING OFF FROM THE FLIGHT DECK OF AN AIRPLANE CARRIER

This photograph was taken during Colonel Lindbergh's visit, February 16, 1929.

UNIV. OF MICH.



Courtesy Office of Naval Intelligence, Navy Department

LIGHT CRUISER DIVISIONS

XLVIII

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and
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Characte

United States									British Empire									Name
Name	Laid down	Completed	Displacement (tons)	Speed	Battery: Main	Battery: Secondary	Battery: Anti-aircraft	Torpedo tubes	Name	Laid down	Completed	Displacement (tons)	Speed	Battery: Main	Battery: Secondary	Battery: Anti-aircraft	Torpedo tubes	
Colorado	1919	1923	32,500	20.67	8–16"/45	12–5"	8–5"	2	Rodney	1922	1927	33,900	23	9–16"/45	12–6"/50	6–4.7"	2	Mutsu
West Virginia	1920	1923	31,800	21.1	8–16"/45	12–5"	8–5"	2	Nelson	1922	1927	33,500	23	9–16"/45	12–6"/50	6–4.7"	2	Nagato
Maryland	1917	1921	31,500	21.07	8–16"/45	12–5"	8–5"	2	Hood[1]	1916	1920	42,100	31	8–15"/42	12–5.5"/50	4–4"	6	Hyuga
California	1916	1921	32,600	21.46	12–14"/55	12–5"	8–5"	2	Ramillies	1913	1917	29,150	23	8–15"/42	12–6"/45	4–4"	4	Ise
Tennessee	1917	1920	32,300	21.01	12–14"/50	12–5"	8–5"	2	Repulse[1]	1915	1916	32,000	31.5	6–15"/42	15–4"/44	4–4"	10	Yamashiro
Idaho	1915	1919	[2] 30,800	21.29	12–14"/50	12–5"	8–3"	2	Renown[1]	1915	1916	32,000	31.5	6–15"/42	15–4"/44	4–4"	2	Fuso
New Mexico	1915	1918	[2] 30,000	21.08	12–14"/50	12–5"	8–3"	2	Royal Oak	1914	1916	29,150	23	8–15"/42	12–6"/45	4–4"	4	Kirishima[4]
Mississippi	1915	1917	[2] 30,100	21.09	12–14"/50	12–5"	8–3"	2	Royal Sovereign	1914	1916	29,150	23	8–15"/42	12–6"/45	4–4"	4	Haruna[1]
Arizona	1914	1916	[3] 32,100	21	12–14"/45	14–5"	8–3"	2	Resolution	1913	1916	29,150	23	8–15"/42	12–6"/45	4–4"	4	Hiyei[1]
Pennsylvania	1913	1916	[3] 32,100	21.05	12–14"/45	14–5"	8–3"	2	Revenge	1913	1916	29,150	23	8–15"/42	12–6"/45	4–4"	4	Kongo[1]
Oklahoma	1912	1916	28,900	20.58	10–14"/45	12–5"	8–5"	2	Valiant	1913	1916	30,000	25	8–15"/42	12–6"/45	4–4"	4	
Nevada	1912	1916	28,700	20.53	10–14"/45	12–5"	8–5"	0	Malaya	1913	1916	31,100	25	8–15"/42	12–6"/45	4–4"	4	
Texas	1911	1914	27,000	21.05	10–14"/45	16–5"	8–3"	0	Barham	1913	1915	30,000	25	8–15"/42	12–6"/45	4–4"	4	
New York	1911	1914	27,000	21.47	10–14"/45	16–5"	8–3"	0	Warspite	1912	1915	31,100	25	8–15"/42	12–6"/45	4–4"	4	
Arkansas	1910	1912	26,100	21.05	12–12"/50	16–5"	8–3"	0	Queen Elizabeth	1912	1915	31,100	25	8–15"/42	12–6"/45	4–4"	4	
Wyoming	1910	1912	26,000	21.22	12–12"/50	16–5"	8–3"	0	Tiger[1]	1912	1914	28,900	30	8–13.5"/45	12–6"/45	4–4"	4	
Utah	1909	1911	22,000	21.04	10–12"/45	12–5"	8–3"	0	Emperor of India	1912	1914	26,250	21	10–13.5"/45	12–6"/45	4–3"	2	
Florida	1909	1911	21,900	22.08	10–12"/45	12–5"	8–3"	0	Marlborough	1912	1914	26,250	21	10–13.5"/45	12–6"/45	4–3"	2	
									Iron Duke	1912	1914	26,250	21	10–13.5"/45	12–6"/45	4–3"	2	
									Benbow	1912	1914	26,250	21	10–13.5"/45	12–6"/45	4–3"	2	
Total (18)			[4] 523,400						Total (20)			[5] 606,450						Total (10)
Built:									Built:									Built:
Lexington	1921	1927	[6] 33,000	34.24	8–8"		12–5"	4	Glorious	1915	1930	22,500	31	16–4.7"				Kaga
Saratoga	1920	1927	[6] 33,000	33.91	8–8"		12–5"	4	Courageous	1915	1928	22,500	31	16–4.7"				Akagi
Langley	1911	1913	10,286	15	4–5"				Furious	1915	1925	22,450	31	10–5.5"		6–4"		Hosho
									Eagle	1913	1924	22,600	24	9–6"		5–4"		
									Hermes	1918	1924	10,850	25	6–5.5"		3–4"		
									Argus	1914	1918	14,450	20.21			6–4"		
Total (3)			76,286						Total (6)			115,350						Total (3)
Building: None.									Building: None.									Building: Ryuj
Appropriated for:									Appropriated for:									Appropriated f
CV 4			13,800						None.									None.
Grand total (4)			90,086						Grand total (6)			115,350						Grand t (4)
Built:									Built:									Built:
Northampton	1928	1930	10,000	32.5	9–8"		4–5"	6	Shropshire	1927	1929	10,000	32¼	8–8"		4–4"	8	Ashigara
Pensacola	1926	1930	10,000	32.5	10–8"		4–5"	6	Sussex	1927	1929	10,000	32¼	8–8"		4–4"	8	Haguro
Salt Lake City	1927	1929	10,000	32.5	10–8"		4–5"	6	Devonshire	1926	1929	10,000	32¼	8–8"		4–4"	8	Myoko
Memphis	1920	1925	7,050	34.43	12–6"		4–3"	6	London	1926	1929	10,000	32¼	8–8"		4–4"	8	Nachi
Marblehead	1920	1924	7,050	34.42	11–6"		4–3"	6	Canberra	1925	1928	10,000	31.5	8–8"		4–4"	8	Kinugasa
Trenton	1920	1924	7,050	33.91	12–6"		4–3"	6	Australia	1925	1928	10,000	31.5	8–8"		4–4"	8	Aoba
Raleigh	1920	1924	7,050	34.63	12–6"		4–3"	6	Suffolk	1924	1928	10,000	31.5	8–8"		4–4"	8	Kako
Concord	1920	1923	7,050	33.48	12–6"		4–3"	6	Cumberland	1924	1928	10,000	31.5	8–8"		4–4"	8	Furutaka
Richmond	1920	1923	7,050	34.2	12–6"		4–3"	6	Kent	1924	1928	10,000	31.5	8–8"		4–4"	8	Naka
Detroit	1920	1923	7,050	34.63	12–6"		4–3"	6	Cornwall	1924	1928	10,000	31.5	8–8"		4–4"	8	Jintsu
Cincinnati	1920	1923	7,050	34.44	12–6"		4–3"	6	Berwick	1924	1928	10,000	31.5	8–8"		4–4"	8	Abukuma
Milwaukee	1918	1923	7,050	34.64	12–6"		4–3"	6	Enterprise	1918	1926	7,580	33	7–6"		3–4"	16	Sendai
Omaha	1918	1923	7,050	34.87	12–6"		4–3"	6	Emerald	1918	1926	7,550	33	7–6"		3–4"	16	Yubari
									Effingham	1917	1925	9,770	30.5	7–7.5"		3–4"	5	Yura
									Frobisher	1916	1924	9,860	30.5	7–7.5"		4–4"	6	Isuzu
									Diomede	1918	1922	4,850	29	6–6"		3–4"	12	Kinu
									Despatch	1918	1922	4,850	29	6–6"		3–4"	12	Natori
									Capetown	1918	1922	4,200	29	5–6"		2–3"	8	Nagara
									Adelaide	1917	1922	5,100	25.3	9–6"		1–3"	2	Oi
									Durban	1918	1921	4,850	29	6–6"		3–4"	12	Kiso
									Hawkins	1916	1919	9,800	30	7–7.5"		4–4"	6	Kitagami
									Delhi	1917	1919	4,850	29	6–6"		3–4"	12	Tama
									Dunedin	1917	1919	4,850	29	6–6"		3–4"	12	Kuma
									Colombo	1917	1919	4,200	29	5–6"		2–3"	8	Tenryu
									Calcutta	1917	1919	4,200	29	5–6"		2–3"	8	Tatsuta
									Cairo	1917	1919	4,200	29	5–6"		2–3"	8	Yahagi
									Vindictive	1916	1918	9,996	30	6–7.5"		3–4"	6	Hirato
									Dragon	1917	1918	4,850	29	6–6"		3–4"	12	Chikuma
									Dauntless	1917	1918	4,850	29	6–6"		3–4"	12	Tone
									Carlisle	1917	1918	4,200	29	5–6"		2–3"	8	
									Danae	1916	1918	4,850	29	6–6"		3–4"	12	
									Curacoa	1916	1918	4,290	29	5–6"		2–3"	8	
									Coventry	1916	1918	4,290	29	5–6"		2–3"	8	
									Ceres	1916	1917	4,290	29	5–6"		2–3"	8	
									Curlew	1916	1917	4,290	29	5–6"		2–3"	8	

[1] Battle cruiser.
[2] It is department's intention to modernize these ships and about 3,000 tons will be added to each.
[3] Now undergoing modernization. Displacement shown is estimated displacement on completion of modernization.
[4] About 9,000 tons will be added to total shown by modernization *Mississippi, New Mexi*
[5] About 2,200 tons will be added to total shown on completion of *Valiant* now being bulge which will be bulged.
[6] Exclusive of weight allowance under Ch. II, part 3, Sec. 1, Art. (d), of Washington trea means against air and submarine attack.

STATISTICAL DATA ON COMBATANT VESSELS

Capital Ships, Aircraft Carriers, Cruisers, Destroyers, and Submarines in the Navies of United States, British Empire, Japan, France, and Italy

Correct to June 1, 1930

Characteristics of ships whose numbers are affected by the treaty, i.e., capital ships and aircraft carriers

CAPITAL SHIPS (UNDER EFFECTIVE AGE OF 20 YEARS)

ish Empire						Japan										
e-	Speed	Battery			Tor-pedo tubes	Name	Laid down	Com-pleted	Displace-ment (tons)	Speed	Battery			Tor-pedo tubes	Name
		Main	Secondary	Anti-aircraft							Main	Secondary	Anti-aircraft		
00	23	9–16"/45	12–6"/50	6–4.7"	2	Mutsu	1918	1921	32,720	23	8–16"/45	20–5.5"/50	4–3"	8	Lorraine
00	23	9–16"/45	12–6"/50	6–4.7"	2	Nagato	1917	1920	32,720	23	8–16"/45	20–5.5"/50	4–3"	8	Provence
00	31	8–15"/42	12–5.5"/50	4–4"	6	Hyuga	1915	1918	29,990	23	12–14"/45	20–5.5"/50	4–3"	6	Bretagne
60	23	8–15"/42	12–6"/45	4–4"	4	Ise	1915	1917	29,990	23	12–14"/45	20–5.5"/50	4–3"	6	Paris
00	31.5	6–15"/42	15–4"/44	4–4"	10	Yamashiro	1913	1917	29,330	22.5	12–14"/45	16–6"/50	4–3"	6	Jean Bart
00	31.5	6–15"/42	15–4"/44	4–4"	2	Fuso	1912	1915	29,330	22.5	12–14"/45	16–6"/50	4–3"	6	Courbet
60	23	8–15"/42	12–6"/45	4–4"	4	Kirishima*	1912	1915	26,330	27.5	8–14"/45	16–6"/50	4–3"	8	Condorcet
60	23	8–15"/42	12–6"/45	4–4"	4	Haruna[1]	1912	1915	29,330	26	8–14"/45	16–6"/50	4–3"	4	
60	23	8–15"/42	12–6"/45	4–4"	4	Hiyei[1]	1911	1914	26,330	27.5	8–14"/45	16–6"/50	4–3"	8	Diderot
60	23	8–15"/42	12–6"/45	4–4"	4	Kongo[1]	1911	1913	26,330	27.5	8–14"/45	16–6"/50	4–3"	8	
00	25	8–15"/42	12–6"/45	4–4"	4										Voltaire
00	25	8–15"/42	12–6"/45	4–4"	4										
00	25	8–15"/42	12–6"/45	4–4"	4										
00	25	8–15"/42	12–6"/45	4–4"	4										
00	25	8–15"/42	12–6"/45	4–4"	4										
00	30	8–13.5"/45	12–6"/45	4–4"	4										
00	21	10–13.5"/45	12–6"/45	4–3"	2										
00	21	10–13.5"/45	12–6"/45	4–3"	2										
00	21	10–13.5"/45	12–6"/45	4–3"	2										
00	21	10–13.5"/45	12–6"/45	4–3"	2										
00	.....	.....	.....	.....	.....	Total (10)	.....	.....	292,400	.....	.....	.....	.....	.....	Total (9)

AIRCRAFT CARRIERS (UNDER EFFECTIVE AGE OF 20 YEARS)

00	31	16–4.7"	.....	.....	.....	Built:									Built:
00	31	16–4.7"	.....	.....	.....	Kaga	1920	1928	26,900	23	10–8"/50	.....	12–4.7"	.....	Bearn
00	31	10–5.5"	.....	6–4"	.....	Akagi	1920	1927	26,900	28.5	10–8"/50	.....	12–4.7"	.....	
00	24	9–6"	.....	5–4"	.....	Hosho	1919	1922	7,470	25	4–5.5"/50	.....	2–3"	.....	
00	25	6–5.5"	.....	3–4"	.....										
00	20.21	.....	.....	6–4"	.....										
00	.....	.....	.....	.....	.....	Total (3)	.....	.....	61,270	.....	.....	.....	.....	.....	Total (1)
						Building: Ryujo	1929	1932	7,600	25	12–5.1"	.....	.....	.....	Building: None.
						Appropriated for: None.									Appropriated fo None.
00	.....	.....	.....	.....	.....	Grand total (4)	.....	.....	68,870	.....	.....	.....	.....	.....	Grand to (1)

CRUISERS (UNDER EFFECTIVE AGE OF 20 YEARS)

00	32¼	8–8"		4–4"	8	Built:									Built:
00	32¼	8–8"		4–4"	8	Ashigara	1925	1929	10,000	33	10–8"		6–4.7"	12	Suffren
00	32¼	8–8"		4–4"	8	Haguro	1925	1929	10,000	33	10–8"		6–4.7"	12	Duquesne
00	32¼	8–8"		4–4"	8	Myoko	1924	1929	10,000	33	10–8"		6–4.7"	12	Tourville
00	31.5	8–8"		4–4"	8	Nachi	1924	1928	10,000	33	10–8"		6–4.7"	12	Primaguet
00	31.5	8–8"		4–4"	8	Kinugasa	1924	1927	7,100	33	6–8"		4–4.7"	12	Lamotte-Picq
00	31.5	8–8"		4–4"	8	Aoba	1924	1927	7,100	33	6–8"		4–4.7"	12	Duguay Trou
00	31.5	8–8"		4–4"	8	Kako	1922	1926	7,100	33	6–8"		4–3"	12	Metz
00	31.5	8–8"		4–4"	8	Furutaka	1922	1926	7,100	33	6–8"		4–3"	12	Strasbourg
00	31.5	8–8"		4–4"	8	Naka	1922	1925	5,195	33	7–5.5"		2–3"	8	Thionville
00	31.5	8–8"		4–4"	8	Jintsu	1922	1925	5,195	33	7–5.5"		2–3"	8	Mulhouse
00	31.5	8–8"		4–4"	8	Abukuma	1921	1925	5,170	33	7–5.5"		2–3"	8	Waldeck Rou
00	33	7–6"		3–4"	16	Sendai	1922	1924	5,195	33	7–5.5"		2–3"	8	
00	33	7–6"		3–4"	16	Yubari	1922	1923	2,890	33	6–5.5"		1–3"	4	
00	30.5	7–7.5"		3–4"	5	Yura	1921	1923	5,170	33	7–5.5"		2–3"	8	
00	30.5	7–7.5"		4–4"	6	Isuzu	1920	1923	5,170	33	7–5.5"		2–3"	8	
00	29	6–6"		3–4"	12	Kinu	1921	1922	5,170	33	7–5.5"		2–3"	8	
00	29	6–6"		3–4"	12	Natori	1920	1922	5,170	33	7–5.5"		2–3"	8	
00	29	5–6"		2–3"	8	Nagara	1920	1922	5,170	33	7–5.5"		2–3"	8	
00	25.3	9–6"		1–3"	2	Oi	1919	1921	5,100	33	7–5.5"		2–3"	8	
00	29	6–6"		3–4"	12	Kiso	1919	1921	5,100	33	7–5.5"		2–3"	8	
00	30	7–7.5"		4–4"	6	Kitagami	1919	1921	5,100	33	7–5.5"		2–3"	8	
00	29	6–6"		3–4"	12	Tama	1918	1921	5,100	33	7–5.5"		2–3"	8	
00	29	6–6"		3–4"	12	Kuma	1918	1920	5,100	33	7–5.5"		2–3"	8	
00	29	5–6"		2–3"	8	Tenryu	1917	1919	3,230	31	4–5.5"		1–3"	6	
00	29	5–6"		2–3"	8	Tatsuta	1917	1919	3,230	31	4–5.5"		1–3"	6	
00	29	5–6"		2–3"	8	Yahagi	1910	1912	4,400	26	8–6"		2–3"	3	
00	30	6–7.5"		3–4"	6	Hirato	1910	1912	4,400	26	8–6"		2–3"	3	
00	29	6–6"		3–4"	12	Chikuma	1910	1912	4,400	26	8–6"		2–3"	3	
00	29	6–6"		3–4"	12	Tone	1905	1910	3,760	23	2–6" / 10–4.7"		2–3"	3	
00	29	5–6"		2–3"	8										
00	29	6–6"		3–4"	12										
00	29	5–6"		2–3"	8										
00	29	5–6"		2–3"	8										
00	29	5–6"		2–3"	8										
00	29	5–6"		2–3"	8										

will be added to total shown by modernization *Mississippi*, *New Mexico*, and *Idaho*.
will be added to total shown on completion of *Valiant* now being bulged and *Barham* bulged.
ght allowance under Ch. II, part 3, Sec. 1, Art. (d), of Washington treaty providing air and submarine attack.

* *Kirishima* reported completed modernization 1 March 1930. Bli of 3,000 tons; total displacement 29,330 tons.

France

Name	Laid down	Completed	Displacement (tons)	Speed	Battery: Main	Battery: Secondary	Battery: Anti-aircraft	Torpedo tubes
Lorraine	1912	1916	22,189	21.4	10–13.4"/45	18–5.5"/55	4–3"	4
Provence	1912	1916	22,189	21.5	10–13.4"/45	18–5.5"/55	4–3"	4
Bretagne	1912	1915	22,189	20.5	10–13.4"/45	18–5.5"/55	4–3"	4
Paris	1911	1914	22,189	21.4	12–12"/45	22–5.5"/55	4–3"	4
Jean Bart	1910	1913	22,189	22	12–12"/45	22–5.5"/55	4–3"	4
Courbet	1910	1913	22,189	20.8	12–12"/45	22–5.5"/55	4–3"	4
Condorcet	1906	1911	17,597	19.7	4–12"/45 12–9.4"	12–3"	2–3"	2
Diderot	1906	1911	17,597	19.8	4–12"/45 12–9.4"	12–3"	2–3"	2
Voltaire	1906	1911	17,597	20.6	4–12"/45 12–9.4"	12–3"	2–3"	2
Total (9)			185,925					

Italy

Name	Laid down	Completed	Displacement (tons)	Speed	Battery: Main	Battery: Secondary	Battery: Anti-aircraft	Torpedo tubes
Andrea Doria	1912	1915	21,555	21	13–12"/46	16–6"/45 13–3"/50	6–3" 2–1.6"	2
Caio Duilio	1912	1915	21,555	21.3	13–12"/46	16–6"/45 13–3"/50	6–3" 2–1.6"	2
Conte Di Cavour	1910	1915	21,604	22	13–12"/46	18–4.7"/50 13–3"/50	6–3" 2–1.6"	2
Giulio Cesare	1910	1914	21,818	21.5	13–12"/46	18–4.7"/50 13–3"/50	6–3" 2–1.6	2
Total (4)			86,532					

Built:

Bearn	1922	1928	22,050	21.5	8–6.1"		6–3"	6
Total (1)			22,050					

Building: None.

Appropriated for: None.

Grand total (1)			22,050					

Built:

Suffren	1926	1929	10,000	31.3	8–8"		8–3"	6
Duquesne	1924	1928	10,000	35.6	8–8"		8–3"	6
Tourville	1925	1928	10,000	33.2	8–8"		8–3"	6
Primaguet	1923	1927	7,249	33.1	8–6.1"/55		4–3"	12
Lamotte-Picquet	1923	1927	7,249	33	8–6.1"/55		4–3"	12
Duguay Trouin	1922	1926	7,249	33.4	8–6.1"/55		4–3"	12
Metz	1914	1916	5,264	27	8–5.9"/45		2–3"	4
Strasbourg	1912	1914	4,723	26.1	7–5.9"/45		2–3"	4
Thionville	1912	1914	2,922	27	9–3.9"		2–3"	4
Mulhouse	1910	1912	4,527	26	7–5.9"/45		2–3"	2
Waldeck Rousseau	1905	1910	12,617	23.1	14–7.6" 8–3"		2–3" 10–2.6"	2

Built:

Trieste	1925	1929	10,000	36.8	8–8"		16–3.9"	8
Trento	1925	1929	10,000	36.8	8–8"		16–3.9"	8
Bari	1913	1915	3,248	27.5	8–5.9"		3–3"	2
Ancona	1912	1915	3,838	27.5	7–5.9"		3–3"	4
Venezia	1911	1914	2,756	27	9–3.9"		1–3"	3
Brindisi	1911	1914	2,756	27	9–3.9"		1–3"	3
Taranto	1911	1914	3,184	27.5	7–5.9"		2–3"	2
Libia	1911	1913	3,701	22.9	8–4.7"		3–3"	.....
Quarto	1909	1913	2,903	28	6–4.7" 6–3" 4–10"		.....	2
San Marco	1907	1911	9,353	23.7	8–7.5" 10–3"		6–3"	2
San Giorgio	1905	1910	9,232	23.2	4–10" 8–7.5" 10–3"		6–3"	2

March 1930. Blisters and 4" deck armor—total increase

United States

Name	Laid down	Completed	Standard displacement (tons)	Speed	Battery: Main	Battery: Anti-aircraft	Torpedo tubes
Total built (13)			100,500				
Building:							
CL 36[1]		1933	10,000	32.5	9–8″	8–5″	6
CL 35 (Indianapolis)[1]		1932	10,000	32.5	9–8″	8–5″	6
CL 34[1]		1933	10,000	32.5	9–8″	8–5″	6
CL 33[1]	1930	1932	10,000	32.5	9–8″	8–5″	6
CL 32[1]		1932	10,000	32.5	9–8″	8–5″	6
Augusta	1928	1931	10,000	32.7	9–8″	4–5″	6
Chicago	1928	1931	10,000	32.7	9–8″	4–5″	6
Louisville	1928	1931	10,000	32.7	9–8″	4–5″	6
Houston	1928	1930	10,000	32.7	9–8″	4–5″	6
Chester	1928	1930	10,000	32.7	9–8″	4–5″	6
Total building (10)			100,000				
		To be completed					
Appropriated for:							
CL 41			10,000		8″		
CL 40			10,000		8″		
CL 39			10,000		8″		
CL 38			10,000		8″		
CL 37			10,000		8″		
Total appropriated for (5)			50,000				
Authorized:							
CL 46			10,000		8″		
CL 45			10,000		8″		
CL 44			10,000		8″		
CL 43			10,000		8″		
CL 42			10,000		8″		
Total authorized (5)			50,000				
Grand total (33)			300,500				

British Empire

Name	Laid down	Completed	Standard displacement (tons)	Speed	Battery: Main	Battery: Anti-aircraft	Torpedo tubes
Cardiff	1916	1917	4,290	29	5–6″	2–3″	8
Caledon	1916	1917	4,180	29	5–6″	2–3″	8
Calypso	1916	1917	4,180	29	5–6″	2–3″	8
Caradoc	1916	1917	4,180	29	5–6″	2–3″	8
Concord	1915	1916	4,120	29	4–6″	2–3″	2
Centaur	1915	1916	4,120	29	4–6″	2–3″	2
Constance	1915	1916	3,920	29	4–6″	2–3″	2
Canterbury	1914	1916	3,920	29	4–6″	2–3″	2
Cambrian	1914	1916	3,920	29	4–6″	2–3″	2
Brisbane	1913	1916	5,120	25.5	8–6″	1–3″	2
Castor	1914	1915	3,920	29	4–6″	2–3″	2
Champion	1914	1915	3,920	29	4–6″	1–3″	6
Calliope	1914	1915	3,920	29	4–6″	2–3″	2
Cleopatra	1914	1915	3,895	29	4–6″	2–3″	4
Carysfort	1914	1915	3,895	29	4–6″	2–3″	4
Comus	1913	1915	3,895	29	4–6″	2–3″	4
Birmingham	1912	1914	5,120	25.5	9–6″	1–3″	2
Lowestoft	1912	1914	5,120	25.5	9–6″	1–3″	2
Dartmouth	1910	1911	4,860	25	8–6″	1–3″	2
Total built (54)			327,111				
Building:							
Dorsetshire	1927	1930	10,000		8–8″	4–4″	8
Exeter	1928	1931	8,400		6–8″/50	4–4″/45	6
Norfolk	1927	1930	10,000		8–8″	4–4″	8
York	1927	1930	8,400	32.25	6–8″/50	4–4″/45	6
Total building (4)			36,800				
		To be completed					
Appropriated for:							
One			6,500		6″		
Total appropriated for (1)			6,500				
Authorized:							
None.							
Grand total (59)			370,411				

[1] Under construction but laying of keels of CL-32, 34, and 36 being built in Government yards suspended.

United States

Name	Laid down	To be completed	Standard displacement (tons)	Speed	Battery: Main	Battery: Anti-aircraft	Torpedo tubes
Pittsburgh	1901	1905	12,715	22.44	4–8″ 4–6″ 6–3″	2–3″	2
Galveston	1901	1905	2,693	16.41	8–5″ 1–3″		
Denver	1900	1904	2,693	16.75	8–5″	1–3″	
Rochester	1890	1893	7,400	21.00	4–5″ 8–5″	2–3″	
Total (4)[1]			25,501				

British Empire

Name	Laid down	To be completed	Standard displacement (tons)	Speed	Battery: Main	Battery: Anti-aircraft	Torpedo tubes

[1] Does not include 9 cruisers of 86,915 tons listed for disposal.

CRUISERS (UNDER EFFECTIVE AGE OF 20 YEARS)—Continued

Speed	Battery: Main	Battery: Anti-aircraft	Torpedo tubes	Japan: Name	Laid down	Completed	Standard displacement (tons)	Speed	Battery: Main	Battery: Anti-aircraft	Torpedo tubes	Name
29	5–6″	2–3″	8									
29	5–6″	2–3″	8									
29	5–6″	2–3″	8									
29	5–6″	2–3″	8									
29	4–6″	2–3″	2									
29	4–6″	2–3″	2									
29	4–6″	2–3″	2									
29	4–6″	2–3″	2									
29	4–6″	2–3″	2									
25.5	8–6″	1–3″	2									
29	4–6″	2–3″	2									
29	4–6″	1–3″	6									
29	4–6″	2–3″	2									
29	4–6″	2–3″	4									
29	4–6″	2–3″	4									
29	4–6″	2–3″	4									
25.5	9–6″	1–3″	2									
25.5	9–6″	1–3″	2									
25	8–6″	1–3″	2									
.....	.....	.....	.....	Total built (29)	.....	.....	166,815	.....	.....	.....	.....	Total built (11)
				Building:								Building:
.....	8–8″	4–4″	8	Maya	1928	1932	10,000	33	10–8″	4–4.7″	8	Dupleix
.....	6–8″/50	4–4″/45	6	Chokai	1928	1931	10,000	33	10–8″	4–4.7″	8	Jeanne D'Arc
.....	8–8″	4–4″	8	Takao	1927	1931	10,000	33	10–8″	4–4.7″	8	Foch
32.25	6–8″/50	4–4″/45	6	Atago	1927	1931	10,000	33	10–8″	4–4.7″	8	Colbert
.....	.....	.....	.....	Total building (4)	.....	.....	40,000	.....	.....	.....	.....	Total building (4
						To be completed						
.....	6″	.....	.....	Appropriated for: None.								Appropriated for: C-4
												Total appropriated
				Authorized: None.								Authorized: None.
				Grand total (33)	.....	.....	206,815	.....	.....	.....	.....	Grand total (16)

CRUISERS (OVER EFFECTIVE AGE OF 20 YEARS)

Speed	Battery: Main	Battery: Anti-aircraft	Torpedo tubes	Japan: Name	Laid down	To be Completed	Standard displacement (tons)	Speed	Battery: Main	Battery: Secondary	Torpedo tubes	Name
				Nisshin	1902	1904	7,080	20.4	4–8″	14–5.9″ 5–3″	4	Ernest Renan
				Kasuga	1902	1904	7,080	20	1–9.8″ 2–8″	14–6″ 5–3″	4	Jules Michelet
				Tsushima	1901	1904	3,120	20	6–6″ 8–3″	1–3″AA	.....	Conde
				Manshu	.....	1904	3,510	12	2–3″	2–2″	.....	Gueydon
				Iwata	1898	1901	9,180	20.75	4–8″	14–6″ 5–3″	4	Jeanne d'Arc
				Izumo	1898	1900	9,180	20.75	4–8″	14–6″ 5–3″	4	
				Adzuma	1898	1900	8,640	20	4–8″	12–6″ 5–3″	.....	
				Yakumo	1898	1900	9,010	20	4–8″	12–6″ 5–3″	4	
				Asama	1896	1899	9,240	21.25	4–8″	12–6″ 5–3″	4	
				Total (9)	.....	.....	66,040					Total (5)

France								Italy							
Name	Laid down	Completed	Standard displacement (tons)	Speed	Battery: Main	Battery: Anti-aircraft	Torpedo tubes	Name	Laid down	Completed	Standard displacement (tons)	Speed	Battery: Main	Battery: Anti-aircraft	Torpedo tubes
Total built (11)			81,800					Total built (11)			60,971				
ng:			10,000	32	8–8″	8–3.5″	6	Building:							
pleix	1929		6,496	26.5	8–6.1″	4–3″	2	Bolzano	1929		10,000	36	8–8″/50	16–3.9″	8
nne D'Arc	1928					2–1.5″		Armando Diaz	1929		5,009	37	8–6″	6–3.9″	4
ch	1928		10,000	32	8–8″	8–3.5″	6	Luigo Cadorna	1929		5,009	37	8–6″	6–3.9″	4
lbert	1927		10,000	31.9	8–8″	8–3.5″	6	Gorizia	1929		10,000	33	8–8″/50	16–3.9″	
								Zara	1929		10,000	33	8–8″/50	16–3.9″	
								Fiume	1929		10,000	33	8–8″/50	16–3.9″	
								Alberto Da Guisanno	1928		4,896	37	8–6″	6–3.9″	4
								Alberico Da Barbanio	1928		4,896	37	8–6″	6–3.9″	4
								Bartolomeo Colleoni	1928		4,896	37	8–6″	6–3.9″	4
								Giovanni Dalle Bandenere	1928		4,896	37	8–6″	6–3.9″	4
Total building (4)			36,496					Total building (10)			69,602				
		To be completed								To be completed					
priated for:								Appropriated for:							
			10,000		8–8″			None.							
tal appropriated for (1)			10,000												
rized:								Authorized:							
one.								None.							
rand total (16)			128,296					Grand total (21)			130,573				

France								Italy							
Name	Laid down	To be completed	Standard displacement (tons)	Speed	Battery: Main	Battery: Anti-aircraft	Torpedo tubes	Name	Laid down	To be completed	Standard displacement (tons)	Speed	Battery: Main	Battery: Anti-aircraft	Torpedo tubes
t Renan	1903	1909	12,234	24.4	4–7.6″ 12–6.5″ 4–3″	2–3″ 8–2.6″	2	Pisa	1905	1909	8,760	23.4	4–10″ 8– 7.5″ 12– 3″	6–3″	2
Michelet	1902	1908	11,072	22.8	4–7.6″ 12–6.5″	2–3″	2								
	1899	1904	8,758	21.3	2–7.6″ 6–6.5″										
don	1897	1903	8,189	18	9–5.4″	4–3″									
e d'Arc	1895	1903	9,743	21	2–7.6″ 8–5.4″	2–3″	2								
tal (5)			49,996					Total (1)			8,763				

UNIV. OF MICH.

United States

Name	Laid down	Completed	Standard displacement (tons)	Speed	Battery		Torpedo tubes
					Main	Anti-aircraft	
Built:							
Perry	1920	1922	1,051	33.37	4-4"	1-3"	12
Decatur	1920	1922	1,051	32.73	4-4"	1-3"	12
Trever	1919	1922	1,051	32.80	4-4"	1-3"	12
Bainbridge	1919	1921	1,051	33.87	4-4"	1-3"	12
Goff	1919	1921	1,051	33.62	4-4"	1-3"	12
Hopkins	1919	1921	1,051	33.97	4-4"	1-3"	12
Paul Jones	1919	1921	1,051	35.14	4-4"	1-3"	12
Lawrence	1919	1921	1,051	33.88	4-4"	1-3"	12
Noa	1918	1921	1,051	31.89	4-4"	1-3"	12
Truxtun	1919	1921	1,051	35.18	4-4"	1-3"	12
Wasmuth	1919	1921	1,051	35.00	4-4"	1-3"	12
W. C. Wood	1918	1921	1,051	35.98	4-4"	1-3"	12
Zane	1918	1921	1,051	34.27	4-4"	1-3"	12
Tillman	1918	1921	990	35.00	4-4"	1-3"	12
Geo. E. Badger	1918	1920	1,051	33.96	4-4"	1-3"	12
Barry	1919	1920	1,051	33.87	4-4"	1-3"	12
Borie	1919	1920	1,051	35.07	4-4"	1-3"	12
Branch	1918	1920	1,051	36.48	4-4"	1-3"	12
Brooks	1918	1920	1,051	33.26	4-5"	1-3"	12
Bulmer	1919	1920	1,051	35.00	4-4"	1-3"	12
Childs	1919	1920	1,051	33.85	4-4"	1-3"	12
Dahlgren	1918	1920	1,051	34.88	4-4"	1-3"	12
Dallas	1918	1920	1,051	35.04	4-4"	1-3"	12
Edsall	1919	1920	1,051	35.20	4-4"	1-3"	12
J. D. Edwards	1919	1920	1,051	35.06	4-4"	1-3"	12
John D. Ford	1919	1920	1,051	35.11	4-4"	1-3"	12
Fox	1919	1920	1,051	33.92	4-5"	1-3"	12
Gilmer	1918	1920	1,051	33.82	4-5"	1-3"	12
Goldsborough	1918	1920	1,051	35.28	4-4"	1-3"	12
Hatfield	1918	1920	1,051	33.84	4-5"	1-3"	12
Herndon	1918	1920	1,051	35.30	4-4"	1-3"	12
Hulbert	1918	1920	1,051	34.44	4-4"	1-3"	12
Humphreys	1918	1920	1,051	33.81	4-4"	1-3"	12
Hunt	1918	1920	1,051	35.79	4-4"	1-3"	12
Reuben James	1919	1920	1,051	33.83	4-4"	1-3"	12
Kane	1918	1920	1,051	33.78	4-5"	1-3"	12
King	1919	1920	1,051	33.99	4-4"	1-3"	12
Litchfield	1919	1920	1,051	34.92	4-4"	1-3"	12
MacLeish	1919	1920	1,051	35.05	4-4"	1-3"	12
Mason	1918	1920	1,051	35.05	4-4"	1-3"	12
McCormick	1919	1920	1,051	35.04	4-4"	1-3"	12
McFarland	1918	1920	1,051	33.76	4-4"	1-3"	12
Overton	1918	1920	1,051	32.84	4-4"	1-3"	12
Parrott	1917	1920	1,051	35.05	4-4"	1-3"	12
J. K. Paulding	1918	1920	1,051	33.89	4-4"	1-3"	12
Peary	1919	1920	1,051	35.06	4-4"	1-3"	12
Pillsbury	1919	1920	1,051	35.06	4-4"	1-3"	12
Pope	1919	1920	1,051	35.08	4-4"	1-3"	12
Preble	1919	1920	1,051	35.51	4-4"	1-3"	12
William V. Preston	1918	1920	1,051	35.14	4-4"	1-3"	12
Pruitt	1919	1920	1,051	35.11	4-4"	1-3"	12
Sands	1919	1920	1,051	33.87	4-4"	1-3"	12
Semmes	1918	1920	1,051	35.42	5-4"	1-3"	12
Sicard	1919	1920	1,051	35.44	4-4"	1-3"	12
Simpson	1919	1920	1,051	35.03	4-4"	1-3"	12
Stewart	1919	1920	1,051	35.09	4-4"	1-3"	12
Sturtevant	1918	1920	1,051	33.82	4-4"	1-3"	12
Tracy	1919	1920	1,051	35.04	4-4"	1-3"	12
Abel P. Upshur	1918	1920	1,051	35.18	4-4"	1-3"	12
Whipple	1919	1920	1,051	35.05	4-4"	1-3"	12
Williamson	1919	1920	1,051	33.76	4-4"	1-3"	12
Howard	1918	1920	1,027	34.75	4-4"	1-3"	12
Stansbury	1918	1920	1,027	33.50	4-4"	1-3"	12
Gwin	1917	1920	939	30.29	4-4"	2-3"	12
Welles	1918	1919	1,051	34.33	4-4"	1-3"	12
Edwards	1919	1919	1,051	33.92	4-4"	1-3"	12
Abbott	1918	1919	1,051	34.04	4-4"	1-3"	12
Alden	1918	1919	1,051	34.14	4-4"	1-3"	12
Aulick	1918	1919	1,051	34.30	4-4"	1-3"	12
Bailey	1918	1919	1,051	34.50	4-4"	1-3"	12
Bancroft	1918	1919	1,051	34.36	4-4"	1-3"	12
Ballard	1918	1919	1,051	35.15	4-4"	1-3"	12
Barker	1919	1919	1,051	35.20	4-4"	1-3"	12
Belknap	1918	1919	1,051	34.63	4-4"	1-3"	12
Broome	1918	1919	1,051	35.03	4-4"	1-3"	12
Chandler	1918	1919	1,051	34.75	4-4"	1-3"	12
Clemson	1918	1919	1,051	35.54	4-4"	1-3"	12
Gillis	1918	1919	1,051	34.55	4-4"	1-3"	12
Greene	1918	1919	1,051	34.72	4-4"	1-3"	12
Hovey	1918	1919	1,051	35.13	4-4"	1-3"	12
Osmond Ingram	1918	1919	1,051	34.44	4-4"	1-3"	12
Laub	1918	1919	1,051	34.37	4-4"	1-3"	12
Long	1918	1919	1,051	35.03	4-4"	1-3"	12
McCalla	1918	1919	1,051	34.30	4-4"	1-3"	12
McCook	1918	1919	1,051	34.73	4-4"	1-3"	12
McLanahan	1918	1919	1,051	34.16	4-4"	1-3"	12
Meade	1918	1919	1,051	34.65	4-4"	1-3"	12
Morris	1918	1919	1,051	34.70	4-4"	1-3"	12
Rodgers	1918	1919	1,051	34.47	4-4"	1-3"	12
Satterlee	1918	1919	1,051	34.99	4-4"	1-3"	12
Shubrick	1918	1919	1,051	34.67	4-4"	1-3"	12
Southard	1918	1919	1,051	34.99	4-4"	1-3"	12

British Empire

Name	Laid down	Completed	Standard displacement (tons)	Speed	Battery		Torpedo tubes
					Main	Anti-aircraft	
Built:							
Amason	1925	1927	1,352	37	4-4.7"		6
Ambuscade	1924	1927	1,173	37	4-4.7"		6
Keppel	1918	1925	1,480	36	5-4.7"	1-3"	6
Broke	1918	1925	1,480	36	5-4.7"	1-3"	6
Shikari	1918	1924	905	36	3-4"		4
Whitehall	1918	1924	1,120	34	4-4.7"		6
Witch	1918	1924	1,140	35	4-4.7"		6
Wren	1918	1923	1,120	34	4-4.7"		6
Worcester	1918	1923	1,120	34	4-4.7"		6
Tracian	1918	1922	905	36	3-4"		4
Stormcloud	1918	1920	905	36	3-4"		4
Wolverine	1918	1920	1,120	34	4-47."		6
Wishart	1918	1920	1,140	35	4-4.7"		6
Wallace	1917	1919	1,480	36	5-4.7"	1-3"	6
Malcolm	1918	1919	1,530	36.5	5-4.7"	1-3"	6
Mackay	1918	1919	1,530	36.5	5-4.7"	1-3"	6
Tattoo	1917	1919	905	36	3-4"		4
Tasmania	1917	1919	905	36	3-4"		4
Swordsman	1917	1919	905	36	3-4"		4
Stalwart	1918	1919	905	36	3-4"		4
Success	1917	1919	905	36	3-4"		4
Champlain	1918	1919	905	36	3-4"		4
Vancouver	1917	1919	905	36	3-4"		4
Tourmaline	1918	1919	905	36	3-4"		4
Vansittart	1918	1919	1,120	34	4-4.7"		6
Venomous	1918	1919	1,120	34	4-4.7"		6
Verity	1918	1919	1,120	34	4-4.7"		6
Volunteer	1918	1919	1,120	34	4-4.7"		6
Veteran	1918	1919	1,120	34	4-4.7"		6
Wanderer	1918	1919	1,120	34	4-4.7"		6
Whitshed	1918	1919	1,120	34	4-4.7"		6
Wildswan	1918	1919	1,120	34	4-4.7"		6
Witherington	1918	1919	1,120	34	4-4.7"		6
Wivern	1918	1919	1,120	34	4-4.7"		6
Thanet	1917	1919	905	36	3-4"		4
Strenuous	1918	1919	905	36	3-4"		4
Stronghold	1918	1919	905	36	3-4"		4
Sturdy	1918	1919	905	36	3-4"		4
Turquoise	1917	1919	790	36	3-4"		4
Tuscan	1917	1919	790	36	3-4"		4
Truant	1918	1919	905	36	3-4"		4
Trusty	1918	1919	905	36	3-4"		4
Shamrock	1917	1919	905	36	3-4"		4
Saladin	1917	1919	905	36	3-4"		4
Sardonyx	1918	1919	905	36	3-4"		4
Seawolf	1918	1919	905	36	3-4"		4
Serapis	1917	1919	905	36	3-4"		4
Serene	1918	1919	905	36	3-4"		4
Sesame	1918	1919	905	36	3-4"		4
Steadfast	1917	1919	905	36	3-4"		4
Sterling	1917	1919	905	36	3-4"		4
Spindrift	1918	1919	905	36	3-4"		4
Turbulent	1917	1919	905	36	3-4"		4
Tenedos	1917	1919	905	36	3-4"		4
Douglas	1917	1918	1,530	36.5	5-4.7"	1-3"	6
Bruce	1917	1918	1,530	36.5	5-4.7"	1-3"	6
Stuart	1917	1918	1,530	36.5	5-4.7"	1-3"	6
Montrose	1917	1918	1,530	36.5	5-4.7"	1-3"	6
Campbell	1917	1918	1,530	36.5	5-4.7"	1-3"	6
Viscount	1916	1918	1,120	35	4-4"		6
Vortigern	1917	1918	1,090	34	4-4"		5
Vidette	1917	1918	1,090	34	4-4"		6
Vivien	1917	1918	1,090	34	4-4"		6
Vimy	1917	1918	1,090	34	4-4"		5
Velox	1917	1918	1,090	34	4-4"		5
Versatile	1917	1918	1,090	34	4-4"		5
Vesper	1916	1918	1,090	34	4-4"		6
Viceroy	1916	1918	1,120	35	4-4"		6
Walpole	1917	1918	1,100	34	4-4"		6
Sportive	1917	1918	905	36	3-4"		4
Sparrowhawk	1917	1918	905	36	3-4"		4
Splendid	1917	1918	905	36	3-4"		4
Swallow	1917	1918	905	36	3-4"		4
Tilbury	1917	1918	905	36	3-4"		4
Tintagel	1917	1918	905	36	3-4"		4
Tribune	1917	1918	905	36	3-4"		4
Trinidad	1917	1918	905	36	3-4"		4
Trojan	1918	1918	905	36	3-4"		4
Sabre	1917	1918	905	36	3-4"		4
Tactician	1917	1918	905	36	3-4"		4
Tara	1917	1918	905	36	3-4"		6
Scimitar	1917	1918	905	36	3-4"		4
Scythe	1918	1918	905	36	3-4"		4
Seabear	1918	1918	905	36	3-4"		4
Seafire	1918	1918	905	36	3-4"		4
Searcher	1918	1918	905	36	3-4"		4
Sepoy	1917	1918	905	36	3-4"		4
Seraph	1917	1918	905	36	3-4"		4
Sirdar	1917	1918	905	36	3-4"		4
Somme	1917	1918	905	36	3-4"		4
Simoon	1917	1918	905	36	3-4"		4
Whitley	1917	1918	1,100	34	4-4"		6

Na
Built:
Shikanami
Urunami
Miyuki
Murakumo
Hatsuyuki
Isonami
Fubuki
Shinonome
Usugumo
Shirakumo
Shirayuki
Mochizuki
Yuzuki
Minatsuki
Mikazuki
Nagatsuki
Kikuzuki
Uzuki
Yayoi
Fumitsuki
Mutsuki
Satsuki
Kisaragi
Oite
Hayate
Yunagi
Asanagi
Matsukaze
Yugao
Sawarabi
Hatakaze
Sanae
Karukaya
Asakaze
Harukaze
Asagao
Fuyo
Sumire
Kuretake
Kamikaze
Namikaze
Wakatake
Numakaze
Yomogi
Tade
Hasu
Hishi
Nokaze
Tachikaze
Hokaze
Ashi
Nadakaze
Yukaze
Shiokaze
Tsuta
Fuji
Susuki
Akikaze
Hagi
Aoi
Kiku
Shimakaze
Hakaze
Okikaze
Kaki
Tsuga
Yakaze
Minekaze
Kuri
Nire
Kaya
Sawakaze
Take
Nashi
Momi
Tanikaze
Kawakaze
Enoki*
Keyaki
Maki
Tsubaki
Kuwa
Nara*
Tokitsuki
Hamakaze
Isokaze
Amatsukaze
Yanagi
Hinoki
Kashi
Momo

DESTROYERS (UNDER EFFECTIVE AGE OF 16 YEARS)

Japan

Name	Laid down	Completed	Standard displacement (tons)	Speed	Battery		Torpedo tubes
					Main	Anti-aircraft	
Built:							
Shikanami	1928	1929	1,700	34	6–5.1*		9
Urunami	1927	1929	1,700	34	6–5.1*		9
Miyuki	1927	1929	1,700	34	6–5.1*		9
Murakumo	1927	1929	1,700	34	6–5.1*		9
Hatsuyuki	1927	1929	1,700	34	6–5.1*		9
Isonami	1926	1928	1,700	34	6–5.1*		9
Fubuki	1926	1928	1,700	34	6–5.1*		9
Shinoname	1926	1928	1,700	34	6–5.1*		9
Usugumo	1926	1928	1,700	34	6–5.1*		9
Shirakumo	1926	1928	1,700	34	6–5.1*		9
Shirayuki	1927	1928	1,700	34	6–5.1*		9
Mochizuki	1926	1927	1,315	34	6–5.1*		9
Yuzuki	1925	1927	1,315	34	6–5.1*		9
Minatsuki	1925	1927	1,315	34	6–5.1*		9
Mikazuki	1925	1927	1,315	34	6–5.1*		9
Nagatsuki	1925	1927	1,315	34	6–5.1*		9
Kikuzuki	1925	1926	1,315	34	4–4.7*		6
Uzuki	1924	1926	1,315	34	4–4.7*		6
Yayoi	1924	1926	1,315	34	4–4.7*		6
Fumitsuki	1924	1926	1,315	34	4–4.7*		6
Mutsuki	1924	1926	1,315	34	4–4.7*		6
Satsuki	1923	1925	1,315	34	4–4.7*		6
Kisaragi	1924	1925	1,315	34	4–4.7*		6
Oite	1923	1925	1,270	34	4–4.7*		6
Hayate	1922	1925	1,270	34	4–4.7*		6
Yunagi	1923	1925	1,270	34	4–4.7*		6
Asanagi	1923	1924	1,270	34	4–4.7*		6
Matsukaze	1922	1924	1,270	34	4–4.7*		6
Yugao	1922	1924	820	31.5	3–4.7*		4
Sawarabi	1922	1924	820	31.5	3–4.7*		4
Hatakaze	1923	1924	1,270	34	4–4.7*		6
Sanae	1922	1923	820	31.5	3–4.7*		4
Karukaya	1922	1923	820	31.5	3–4.7*		4
Asakaze	1922	1923	1,270	34	4–4.7*		6
Harukaze	1922	1923	1,270	34	4–4.7*		6
Asagao	1922	1923	820	31.5	3–4.7*		4
Fuyo	1922	1923	820	31.5	3–4.7*		4
Sumire	1920	1923	770	31.5	3–4.7*		4
Kuretake	1922	1922	820	31.5	3–4.7*		4
Kamikaze	1921	1922	1,270	34	4–4.7*		6
Namikaze	1921	1922	1,215	34	4–4.7*		6
Wakatake	1921	1922	820	31.5	3–4.7*		4
Numakaze	1921	1922	1,215	34	4–4.7*		6
Yomogi	1921	1922	770	31.5	3–4.7*		4
Tade	1920	1922	770	31.5	3–4.7*		4
Hasu	1921	1922	770	31.5	3–4.7*		4
Hishi	1920	1922	770	31.5	3–4.7*		4
Nokaze	1921	1922	1,215	34	4–4.7*		6
Tachikaze	1920	1921	1,215	34	4–4.7*		6
Hokaze	1920	1921	1,215	34	4–4.7*		6
Ashi	1920	1921	770	31.5	3–4.7*		4
Nadakaze	1920	1921	1,215	34	4–4.7*		6
Yukaze	1920	1921	1,215	34	4–4.7*		6
Shiokaze	1920	1921	1,215	34	4–4.7*		6
Tsuta	1920	1921	770	31.5	3–4.7*		4
Fuji	1920	1921	770	31.5	3–4.7*		4
Susuki	1920	1921	770	31.5	3–4.7*		4
Akikaze	1920	1921	1,215	34	4–4.7*		6
Hagi	1920	1921	770	31.5	3–4.7*		4
Aoi	1920	1920	770	31.5	3–4.7*		4
Kiku	1920	1920	770	31.5	3–4.7*		4
Shimakaze	1919	1920	1,215	34	4–4.7*		6
Hakaze	1918	1920	1,215	34	4–4.7*		6
Okikaze	1919	1920	1,215	34	4–4.7*		6
Kaki	1919	1920	770	31.5	3–4.7*		4
Tsuga	1919	1920	770	31.5	3–4.7*		4
Yakaze	1918	1920	1,215	34	4–4.7*		6
Minekaze	1918	1920	1,215	34	4–4.7*		6
Kuri	1919	1920	770	31.5	3–4.7*		4
Nire	1919	1920	770	31.5	3–4.7*		4
Kaya	1918	1920	770	31.5	3–4.7*		4
Sawakaze	1918	1920	1,215	34	4–4.7*		6
Take	1918	1919	770	31.5	3–4.7*		4
Nashi	1918	1919	770	31.5	3–4.7*		4
Momi	1918	1919	770	31.5	3–4.7*		4
Tanikaze	1916	1919	1,180	34	3–4.7*		6
Kawakaze	1917	1918	1,180	34	3–4.7*		6
Enoki*	1917	1918	770	31.5	3–4.7*		6
Keyaki	1917	1918	770	31.5	3–4.7*		6
Maki	1917	1918	770	31.5	3–4.7*		6
Tsubaki	1917	1918	770	31.5	3–4.7*		6
Kuwa	1917	1918	770	31.5	3.4.7*		6
Nara*	1917	1918	770	31.5	3–4.7*		6
Tokitsukaze	1916	1917	1,105	34	4–4.7*		6
Hamakaze	1916	1917	1,105	34	4–4.7*		6
Isokaze	1916	1917	1,105	34	4–4.7*		6
Amatsukaze	1916	1917	1,105	34	4–4.7*		6
Yanagi	1916	1917	755	31.5	3–4.7*		6
Hinoki	1916	1917	755	31.5	3–4.7*		6
Kashi	1916	1917	755	31.5	3–4.7*		6
Momo	1916	1916	755	31.5	3–4.7*		6

France

Name	Laid down	Completed	Standard displacement (tons)	Sp
Built:				
Verdun	1927	1930	2,436	36
Bordelais	1926	1930	1,377	32
Fougeux	1927	1930	1,377	33
Valmy	1927	1929	2,436	37
L'Alcyon	1925	1929	1,377	32
L'Adroit	1925	1929	1,377	32
Guepard	1927	1929	2,436	35
Boulonnais	1926	1928	1,377	32
Brestois	1926	1928	1,377	32
Le Mars	1925	1928	1,377	33
Le Fortune	1925	1928	1,377	32
La Railleuse	1925	1928	1,377	32
La Palme	1925	1928	1,377	33
Tornade	1923	1928	1,319	32
Typhon	1923	1928	1,319	32
Mistral	1923	1927	1,319	33
Cyclone	1923	1927	1,319	33
Trombe	1923	1927	1,319	31
Tramontane	1923	1927	1,319	32
Sirocco	1923	1927	1,319	32
Ouragan	1923	1927	1,319	33
Panthere	1923	1927	2,126	35
Leopard	1923	1927	2,126	34
Lynx	1923	1927	2,126	34
Tigre	1923	1926	2,126	35
Jaguar	1923	1926	2,126	34
Chacal	1923	1926	2,126	34
Tempete	1923	1926	1,319	33
Orage	1923	1926	1,319	32
Simoun	1923	1926	1,319	32
Bourrasque	1923	1926	1,319	32
Enseigne Gabolde	1913	1924	802	33
Delage	.....	1919	788	32
Rageot de la Touche	.....	1919	788	30
Admiral Senes	1917	1918	1,527	31
Buino	1917	1918	808	30
Deligny	.....	1918	769	28
Chastang	.....	1918	769	29
Vesco	.....	1918	769	28
Mazare	.....	1918	769	28
Algerien	1917	1918	600	30
Matelot le Blanc	1916	1917	749	30
Touareg	1917	1917	600	29
Tonkinois	1917	1917	600	29
Somali	1917	1917	600	29
Senegalais	1917	1917	600	29
Sakalave	1917	1917	600	30
Marocain	1917	1917	600	30
Kabyle	1917	1917	600	29
Hova	1917	1917	600	29
Bambara	1917	1917	600	29
Arabe	1917	1917	600	28
Annamile	1917	1917	600	30
Enseigne Roux	1913	1916	788	30
M. Principal Lestin	1913	1916	788	36
Pierre Durand	.....	1916	808	30
Commandant Lucas	1911	1915	680	29
Temeraire	1911	1914	915	21
Opiniatre	1911	1914	915	21
Intrepide	1911	1914	915	27
Aventurier	1911	1914	915	27
Mangini	1911	1914	690	30
Protet	1911	1914	679	28

France					Italy								
Standard displacement (tons)	Speed	Battery		Torpedo tubes	Name	Laid down	Completed	Standard displacement (tons)	Speed	Battery		Torpedo tubes
		Main	Anti-aircraft							Main	Anti-aircraft	
					Built:							
2,436	36.7	5–5.5"	4–1.5"	6	Nicolo Zeno	1927	1929	1,628	38	6–4.7"	2–1.6"	6
1,377	32.5	4–5.1"	2–1.5"	6	Emanuele Passagno	1927	1929	1,628	38	6–4.7"	2–1.6"	6
1,377	33.5	4–5.1"	2–1.5"	6	Nicoloso Da Recco	1927	1929	1,628	38	6–4.7"	2–1.6"	6
2,436	37	5–5.5"	4–1.5"	6	Lanzerotto Malocello	1927	1929	1,628	38	6–4.7"	2–1.6"	6
1,377	32.5	4–5.1"	2–1.5"	6	Leono Pancaldo	1927	1929	1,628	38	6–4.7"	2–1.6"	6
1,377	32.7	4–5.1"	2–1.5"	6	Antonioto Usodimare	1927	1929	1,628	38	6–4.7"	2–1.6"	6
2,436	35.9	5–5.5"	4–1.5"	6	Antonio Da Noli	1927	1929	1,628	38	6–4.7"	2–1.6"	6
1,377	32.1	4–5.1"	2–1.5"	6	Ugolino Vivaldi	1927	1929	1,628	38	6–4.7"	2–1.6"	6
1,377	32.5	4–5.1"	2–1.5"	6	Luca Tarigo	1927	1929	1,628	38	6–4.7"	2–1.6"	6
1,377	33	4–5.1"	2–1.5"	6	Espero	1925	1928	1,072	38.4	4–4.7"	3–1.8"	6
1,377	32.6	4–5.1"	2–1.5"	6	Ostro	1925	1928	1,072	38.4	4–4.7"	3–1.8"	6
1,377	32.7	4–5.1"	2–1.5"	6	Zeffiro	1925	1928	1,072	38.4	4–4.7"	3–1.8"	6
1,377	33	4–5.1"	2–1.5"	6	Nembo	1925	1927	1,092	39.5	4–4.7"	3–1.8"	6
1,319	32.1	4–5.1"	1–3"	6	Euro	1925	1927	1,092	39.5	4–4.7"	3–1.8"	6
1,319	32.6	4–5.1"	1–3"	6	Aquilone	1925	1927	1,092	39.5	4–4.7"	3–1.8"	6
1,319	33.2	4–5.1"	1–3"	6	Borea	1925	1927	1,072	38.4	4–4.7"	3–1.8"	6
1,319	33.3	4–5.1"	1–3"	6	Turbine	1925	1927	1,092	39.5	4–4.7"	3–1.8"	6
1,319	31	4–5.1"	1–3"	6	Cesare Battisti	1924	1927	1,058	37.4	4–4.7"	3–1.6"	6
1,319	32.7	4–5.1"	1–3"	6	Francesco Nullo	1924	1927	1,058	37.4	4–4.7"	3–1.6"	6
1,319	32.7	4–5.1"	1–3"	6	Francesco Crispi	1923	1927	935	38.6	3–4.7"	2–1.6"	4
1,319	33.5	4–5.1"	1–3"	6	Giovanni Nicotera	1925	1927	935	38.6	3–4.7"	2–1.6"	4
2,126	35.3	5–5.1"	2–3"	6	Daniele Manin	1924	1927	1,058	37.4	4–4.7"	3–1.6"	6
2,126	34.9	5–5.1"	2–3"	6	Quintina Sella	1922	1926	935	38.6	3–4.7"	2–1.6"	4
2,126	34.5	5–5.1"	2–3"	6	Bettino Ricasoli	1923	1926	935	38.6	3–4.7"	2–1.6"	4
2,126	35.9	5–5.1"	2–3"	6	Nazario Sauro	1924	1926	1,058	37.4	4–4.7"	3–1.6"	6
2,126	34.7	5–5.1"	2–3"	6	Tigre	1922	1924	1,525	34.3	8–4.7"	2–3"	6
2,126	34.7	5–5.1"	2–3"	6	Pantera	1921	1924	1,525	34.3	8–4.7"	2–3"	6
1,319	33	4–5.1"	1–3"	6	Leone	1921	1924	1,525	34.3	8–4.7"	2–3"	6
1,319	32.5	4–5.1"	1–3"	6	Calatafimi	1920	1924	966	33.5	4–4"	2–3"	4
1,319	32.9	4–5.1"	1–3"	6	Castelfidardo	1920	1924	966	33.5	4–4"	2–3"	4
1,319	32.8	4–5.1"	1–3"	6	Mozambano	1921	1924	966	33.5	4–4"	2–3"	4
802	33.4	3–3.9"	1–3"	4	Confienza	1917	1923	861	33.2	4–4"	2–3"	4
788	32.3	3–4.1"	.....	6	Curtatone	1920	1923	966	33.5	4–4"	2–3"	4
788	30.8	3–4.1"	.....	6	Gen. A. Cascino	1920	1922	635	33.2	3–4"	2–3"	4
1,527	31.5	4–5.9"	2–1.5"	4	Gen. A. Papa	1919	1922	635	33.2	3–4"	2–3"	4
808	30.6	3–4.1"	.....	6	Gen. C. Montanari	1921	1922	635	33.2	3–4"	2–3"	4
769	28.1	3–4.1"	.....	6	Gen. M. Prestinari	1921	1922	635	33.2	3–4"	2–3"	4
769	29.1	3–4.1"	.....	6	San Martino	1917	1922	861	33.2	4–4"	2–3"	4
769	28.2	3–4.1"	.....	6	Gen. A. Chinotto	1919	1921	635	33.2	3–4"	2–3"	4
769	28.3	3–4.1"	.....	6	Solferino	1917	1921	861	33.2	4–4"	2–3"	4
600	30	1–4.7" 3–3"	1–3"	4	Gen. A. Cantore	1919	1921	635	33.2	3–4"	2–3"	4
					Ardimentoso	1914	1920	803	25.1	3–3.9"	2–1.6"	4
749	30.6	2–3.9" 6–2.6"	.....	4	Palestro	1917	1919	861	33.2	4–4"	2–3"	4
600	29.4	1–4.7" 3–3"	1–3"	4	Falco	1916	1919	1,285	35.5	4–4.7" 2–3"	.....	4
					Eugenio Cosenz	1917	1919	635	34	4–4"	2–3"	4
600	29.1	1–4.7" 3–3"	1–3"	4	G. La Farina	1917	1919	635	34	4–4"	2–3"	4
600	29.1	1–4.7" 3–3"	1–3"	4	Monfalcone	1912	1918	561	32.9	2–3.9" 4–2.5"	2–2.5"	4
600	29	1–4.7" 3–3"	1–3"	4	Cortellazzo	1912	1918	561	32.9	2–3.9" 4–2.5"	2–2.5"	4
					G. Medici	1916	1918	635	34	4–4"	2–3"	4
600	30.4	1–4.7" 3–3"	1–3"	4	A. Bassini	1916	1918	635	34	4–4"	2–3"	4
					N. Fabrizi	1916	1918	635	34	4–4"	2–3"	4
600	30	1–4.7" 3–3"	1–3"	4	Premuda	1916	1917	1,525	33.7	4–5.9"	.....	4
					G. Carini	1916	1917	635	34	4–4"	2–3"	4
600	29.5	1–4.7" 3–3"	1–3"	4	G. La Masa	1916	1917	635	34	4–4"	2–3"	4
					G. Acerbi	1916	1917	669	33.6	6–4"	2–1.6"	4
600	29.1	1–4.7" 3–3"	1–3"	4	F. Stocco	1916	1917	669	33.6	6–4"	2–1.6"	4
					V. Orsini	1916	1917	669	33.6	6–4"	2–1.6"	4
600	29.6	1–4.7" 3–3"	1–3"	4	Augusto Riboty	1915	1917	1,383	35	8–4"	.....	4
					Aquila	1914	1917	1,407	36	4–4.7"	2–3"	4
600	28.4	1–4.7" 3–3"	1–3"	4	Audace	1915	1917	628	34.5	7–4"	2–1.6"	4
					Giuseppe Dezza	1913	1916	615	33.8	5–4"	2–1.6"	4
600	30	1–4.7" 3–3"	1–3"	4	Giuseppe Missori	1914	1916	615	33.8	5–4"	2–1.6"	4
					Giuseppe Sirtori	1916	1916	669	33.6	6–4"	2–1.6"	4
788	30.4	2–3.9" 4–2.6"	1–3"	4	Carlo Mirabello	1914	1916	1,383	35	8–4"	.....	4
					Cesare Rossarol	1914	1916	744	36	4–4.7"	.....	4
788	36.7	2–3.9" 4–2.6"	1–3"	4	Grado	1912	1915	561	32.9	2–3.9" 4–2.5"	2–2.5"	4
808	30.8	3–4.1"	.....	6	Simone Schiaffino	1913	1915	615	33.8	5–4"	2–1.6"	4
680	29.2	2–3.9" 4–2.6"	.....	4	Ippolito Nievo	1913	1915	615	33.8	5–4"	2–1.6"	4
					Giuseppe Abba	1913	1915	615	33.8	5–4"	2–1.6"	4
915	21.5	4–3.9"	.....	4	Fratelli Cairoli	1913	1915	615	33.8	5–4"	2–1.6"	4
915	21.5	4–3.9"	.....	4	Antonio Mosto	1913	1915	615	33.8	5–4"	2–1.6"	4
915	27	4–3.9"	.....	4	Guglielmo Pepe	1913	1915	845	32.6	5–4"	2–1.6"	4
915	27	4–3.9"	.....	4	Alessandro Poerio	1913	1915	845	32.6	5–4"	2–1.6"	4
690	30.9	2–3.9" 4–2.6"	.....	4	Rosolino Pilo	1913	1915	615	33.8	5–4"	.....	4
679	28	2–3.9" 4–2.6"	.....	4	Pola	1912	1914	594	33.5	2–3.9" 4–2.5"	2–2.5"	4
					Insidioso	1912	1914	541	35.8	5–4"	.....	4
					Ardito	1912	1914	561	34.4	5–4"	.....	2
					Ardente	1912	1914	561	34.4	5–4"	.....	2

United States

Name	Laid down	Completed	Standard displacement (tons)	Speed	Battery		Torpedo tubes
					Main	Anti-aircraft	
Built—Continued.							
Swasey	1918	1919	1,051	34.78	4–4"	1–3"	12
Smith Thompson	1919	1919	1,051	35.03	4–4"	1–3"	12
Thornton	1918	1919	1,051	34.72	4–4"	1–3"	12
Tingey	1918	1919	1,051	34.53	4–4"	1–3"	12
Turner	1918	1919	1,051	34.16	4–4"	1–3"	12
Bagley	1918	1919	1,049	34.04	4–4"	1–3"	12
Haraden	1918	1919	1,049	33.94	4–4"	1–3"	12
Hopewell	1918	1919	1,049	28.22	4–4"	1–3"	12
Ramsay	1917	1919	1,049	32.64	4–4"	1–3"	12
Thomas	1918	1919	1,049	33.67	4–4"	1–3"	12
Badger	1918	1919	1,047	35.30	4–4"	1–3"	12
Babbitt	1918	1919	1,047	35.21	4–4"	1–3"	12
Dickerson	1918	1919	1,047	35.13	4–4"	1–3"	12
Herbert	1918	1919	1,047	35.21	4–4"	1–3"	12
Jacob Jones	1918	1919	1,047	35.08	4–4"	1–3"	12
Leary	1918	1919	1,047	35.16	4–4"	1–3"	12
Schenck	1918	1919	1,047	35.10	4–4"	1–3"	12
Tattnall	1917	1919	1,047	35.11	4–4"	1–3"	12
Twiggs	1918	1919	1,047	35.04	4–4"	1–3"	12
Bush	1918	1919	1,027	35.14	4–4"	1–3"	12
Crosby	1918	1919	1,027	35.14	4–4"	1–3"	12
Crane	1918	1919	1,027	34.25	4–4"	1–3"	12
Cowell	1918	1919	1,027	35.65	4–4"	1–3"	12
Foote	1918	1919	1,027	35.57	4–4"	1–3"	12
Gridley	1918	1919	1,027	34.40	4–4"	1–3"	12
Harding	1918	1919	1,027	35.02	4–4"	1–3"	12
Hogan	1918	1919	1,027	33.27	4–4"	1–3"	12
Kalk	1918	1919	1,027	35.41	4–4"	1–3"	12
MacKenzie	1918	1919	1,027	33.57	4–4"	1–3"	12
Maddox	1918	1919	1,027	34.97	4–4"	1–3"	12
McKean	1918	1919	1,027	34.44	4–4"	1–3"	12
Meredith	1918	1919	1,027	35.59	4–4"	1–3"	12
O'Bannon	1918	1919	1,027	33.59	4–4"	1–3"	12
Renshaw	1918	1919	1,027	33.83	4–4"	1–3"	12
Thatcher	1918	1919	1,027	34.94	4–4"	1–3"	12
Walker	1918	1919	1,027	34.92	4–4"	1–3"	12
Williams	1918	1919	1,027	34.02	4–4"	1–3"	12
Barney	1918	1919	990	35.20	4–4"	1–3"	12
Blakeley	1918	1919	990	35.06	4–4"	1–3"	12
Biddle	1918	1919	990	35.12	4–4"	1–3"	12
Bernadou	1918	1919	990	35.10	4–4"	1–3"	12
Breckinridge	1918	1919	990	35.21	4–4"	1–3"	12
Buchanan	1918	1919	990	35.40	4–4"	1–3"	12
Claxton	1918	1919	990	35.45	4–4"	1–3"	12
Crowninshield	1918	1919	990	35.43	4–4"	1–3"	12
Roper	1918	1919	990	35.14	4–4"	1–3"	12
Du Pont	1918	1919	990	35.03	4–4"	1–3"	12
Ellis	1918	1919	990	35.17	4–4"	1–3"	12
Hamilton	1918	1919	990	35.13	4–4"	1–3"	12
Hale	1918	1919	990	35.38	4–4"	1–3"	12
Kennison	1918	1919	990	35.89	4–4"	1–3"	12
Elliott	1918	1919	990	35.12	4–4"	1–3"	12
J. Fred Talbott	1918	1919	990	35.09	4–4"	1–3"	12
Aaron Ward	1918	1919	990	35.49	4–4"	1–3"	12
Cole	1918	1919	990	35.11	4–4"	1–3"	12
Anthony (mine layer)	1918	1919	1,027	33.50	3–4"	1–3"	.....
Hart (mine layer)	1918	1919	1,027	33.97	4–4"	1–3"	.....
Ingraham (mine layer)	1918	1919	1,027	34.14	4–4"	1–3"	.....
Rizal (mine layer)	1918	1919	1,027	33.84	4–4"	1–3"	.....
Sproston (mine layer)	1918	1919	1,027	33.57	3–4"	1–3"	.....
Israel (mine layer)	1918	1918	1,027	34.34	4–4"	1–3"	.....
Lansdale (mine layer)	1918	1918	1,027	35.17	4–4"	1–3"	.....
Luce (mine layer)	1918	1918	1,027	34.81	4–4"	1–3"	.....
Murray (mine layer)	1918	1918	1,027	34.84	4–4"	1–3"	.....
Stribling (mine layer)	1917	1918	1,027	34.41	4–4"	1–3"	.....
Craven	1917	1918	939	32.23	4–4"	1–3"	12
Connor	1916	1918	939	30.17	4–4"	1–3"	12
Phillip	1917	1918	990	35.53	4–4"	1–3"	12
Evans	1917	1918	990	35.37	4–4"	1–3"	12
Fairfax	1917	1918	990	35.0	4–4"	1–3"	12
Lea	1917	1918	990	35.04	4–4"	1–3"	12
Taylor	1917	1918	990	35.0	4–4"	1–3"	12
Talbot	1917	1918	990	35.29	4–4"	1–3"	12
Rathburne	1917	1918	990	35.26	3–4"	1–3"	12
Dent	1917	1918	990	35.11	4–4"	1–3"	12
Dorsey	1917	1918	990	35.18	4–4"	1–3"	12
Boggs	1917	1918	990	35.77	4–4"	1–3"	12
Waters	1917	1918	990	35.20	4–4"	1–3"	12
Wickes	1917	1918	990	35.34	4–4"	1–3"	12
Yarnall	1918	1918	990	35.12	4–4"	1–3"	12
Ward	1918	1918	990	34.23	4–4"	1–3"	12
Tarbell	1917	1918	990	35.12	4–4"	1–3"	12
Upshur	1918	1918	990	34.61	4–4"	1–3"	12
Kilty	1917	1918	990	35.22	4–4"	1–3"	12
Greer	1918	1918	990	35.14	4–4"	1–3"	12
Bell	1917	1918	1,027	34.76	4–4"	1–3"	12
Champlain	1917	1918	1,027	33.54	4–4"	1–3"	12
Chew	1918	1918	1,027	33.83	4–4"	1–3"	12
Colhoun	1917	1918	1,027	34.65	4–4"	1–3"	12
Dyer	1917	1918	1,027	34.79	4–4"	1–3"	12
Gregory	1917	1918	1,027	34.34	4–4"	1–3"	12
Kimberly	1917	1918	1,027	34.81	4–4"	1–3"	12

British Empire

Name	Laid down	Completed	Standard displacement (tons)	Speed	Battery		Torpedo tubes
					Main	Anti-aircraft	
Built—Continued.							
Waterhen	1917	1918	1,100	34	4–4"	.....	6
Wryneck	1917	1918	1,100	34	4–4"	.....	6
Windsor	1917	1918	1,100	34	4–4"	.....	6
Wrestler	1917	1918	1,100	34	4–4"	.....	6
Woolston	1917	1918	1,120	35	4–4"	.....	6
Wolsey	1917	1918	1,120	35	4–4"	.....	6
Wessex	1917	1918	1,100	34	4–4"	.....	6
Winchester	1917	1918	1,100	34	4–4"	.....	6
Wolfhound	1917	1918	1,100	34	4–4"	.....	6
Westminster	1917	1918	1,100	34	4–4"	.....	6
Wescott	1917	1918	1,100	34	4–4"	.....	6
Walker	1917	1918	1,100	34	4–4"	.....	6
Walrus	1917	1918	1,100	34	4–4"	.....	6
Warwick	1917	1918	1,100	34	4–4"	.....	6
Watchman	1917	1918	1,100	34	4–4"	.....	6
Whirlwind	1917	1918	1,100	34	4–4"	.....	6
Winchelsea	1917	1918	1,100	34	4–4"	.....	6
Vanessa	1916	1918	1,090	34	4–4"	.....	6
Vanity	1917	1918	1,090	34	4–4"	.....	6
Voyager	1917	1918	1,100	34	4–4"	.....	6
Senator	1917	1918	905	36	3–4"	.....	4
Shark	1917	1918	905	36	3–4"	.....	4
Scout	1917	1918	905	36	3–4"	.....	4
Scotsman	1917	1918	905	36	3–4"	.....	4
Tyrant	1916	1917	760	36	3–4"	.....	4
Teaser	1916	1917	905	35	3–4"	.....	4
Skate	1916	1917	900	36	3–4"	.....	4
Vivacious	1917	1917	1,090	34	4–4"	.....	6
Tempest	1916	1917	900	36	3–4"	.....	4
Tetrarch	1916	1917	900	36	3–4"	.....	4
Thisbe	1916	1917	900	36	3–4"	.....	4
Thruster	1916	1917	900	36	3–4"	.....	4
Torrid	1916	1917	900	36	3–4"	.....	4
Valentine	1916	1917	1,090	34	4–4"	.....	6
Valhalla	1916	1917	1,090	34	4–4"	.....	6
Valkyrie	1916	1917	1,090	34	4–4"	.....	6
Valorus	1916	1917	1,090	34	4–4"	.....	6
Vampire	1916	1917	1,090	34	4–4"	.....	6
Vanoc	1916	1917	1,090	34	4–4"	.....	3
Vanquisher	1917	1917	1,090	34	4–4"	.....	6
Vectis	1916	1917	1,090	34	4–4"	.....	6
Vega	1916	1917	1,090	34	4–4"	.....	6
Vendetta	1916	1917	1,090	34	4–4"	.....	6
Venetia	1917	1917	1,090	34	4–4"	.....	6
Venturous	1916	1917	1,090	34	4–4"	.....	6
Verdun	1916	1917	1,090	34	4–4"	.....	6
Vimiera	1916	1917	1,090	34	4–4"	.....	6
Violent	1916	1917	1,090	34	4–4"	.....	6
Wakeful	1916	1917	1,100	34	4–4"	.....	6
Shakespeare	1916	1917	1,480	36	5–4.7"	1–3"	6
Spencer	1916	1917	1,480	36	5–4.7"	1–3"	6
Anzac	1916	1917	1,310	34	4–4"	.....	4
Abdiel	1915	1916	1,310	34	3–4"	.....	.....
Grenville	1915	1916	1,310	34	4–4"	.....	4
Saumarez	1916	1916	1,310	34	4–4"	.....	4
Salmon	1915	1916	900	36	3–4"	.....	4
Rowena	1915	1916	900	36	3–4"	.....	4
Restless	1915	1916	900	36	3–4"	.....	4

Na

Built—Contin
Urakaze..
Kiri.....
Sugi.....
Matsu....
Kashiwa..
Kusunoki.
Ume.....
Katsura..
Kaede....
Sakaki....
Kaba.....
Ayanama.

* These ve
converted to
April, 1930.

Japan								France			
Name	Laid down	Completed	Standard displacement (tons)	Speed	Battery: Main	Battery: Anti-aircraft	Torpedo tubes	Name	Laid down	Completed	Standard displacement (tons)
lt—Continued.								Built—Continued.			
Urakaze	1913	1915	810	28	1–4.7" 4–3"	.....	4				
Kiri	1914	1915	595	31	1–4.7" 4–3"	.....	4				
Sugi	1914	1915	595	31	1–4.7" 4–3"	.....	4				
Matsu	1914	1915	595	31	1–4.7" 4–3"	.....	4				
Kashiwa	1914	1915	595	31	1–4.7" 4–3"	.....	4				
Kusunoki	1914	1915	595	31	1–4.7" 4–3"	.....	4				
Ume	1914	1915	595	31	1–4.7" 4–3"	.....	4				
Katsura	1914	1915	595	31	1–4.7" 4–3"	.....	4				
Kaede	1914	1915	595	31	1–4.7" 4–3"	.....	4				
Sakaki	1914	1915	595	31	1–4.7" 4–3"	.....	4				
Kaba	1914	1915	595	31	1–4.7" 4–3"	.....	4				
Ayanama	1928	1930	1,700	34	6–5.1"		9				
These vessels reported verted to Mine Sweepers il, 1930.											

France						Italy							
	Standard displacement (tons)	Speed	Battery		Torpedo tubes	Name	Laid down	Completed	Standard displacement (tons)	Speed	Battery		Torpedo tubes
			Main	Anti-aircraft							Main	Anti-aircraft	
						Built—Continued.							

United States

Name	Laid down	Completed	Standard displacement (tons)	Speed	Battery: Main	Battery: Anti-aircraft	Torpedo tubes
Built—Continued.							
McKee	1917	1918	1,027	33.60	4–4"	1–3"	12
Little	1917	1918	1,027	34.73	4–4"	1–3"	12
Mugford	1917	1918	1,027	33.99	4–4"	1–3"	12
Palmer	1918	1918	1,027	35.77	4–4"	1–3"	12
Ringold	1917	1918	1,027	34.37	4–4"	1–3"	12
Robinson	1917	1918	1,027	34.21	4–4"	1–3"	12
Schley	1917	1918	1,027	34.14	4–4"	1–3"	12
Sigourney	1917	1918	1,027	34.70	4–4"	1–3"	12
Stevens	1917	1918	1,027	34.54	4–4"	1–3"	12
Stringham	1917	1918	1,027	34.82	4–4"	1–3"	12
Breese	1917	1918	1,049	32.56	4–4"	1–3"	12
Gamble	1917	1918	1,049	33.20	4–4"	1–3"	12
Lamberton	1917	1918	1,049	33.40	4–4"	1–3"	12
Montgomery	1917	1918	1,049	33.08	4–4"	1–3"	12
Radford	1917	1918	1,049	33.48	4–4"	1–3"	12
Allen	1915	1917	865	30.4	4–4"	1–3"	12
Caldwell	1916	1917	939	31.7	4–4"	1–3"	12
Manley	1916	1917	939	32.23	4–4"	1–3"	12
Stockton	1916	1917	939	30.12	4–4"	1–3"	12
Rowan	1915	1916	905	29.57	4–4"	1–3"	12
Sampson	1915	1916	905	29.52	4–4"	1–3"	12
Cushing	1913	1915	832	29.18	4–4"		8
Nicholson	1913	1915	832	29.08	4–4"		8
O'Brien	1913	1915	832	29.16	4–4"		8
Wadsworth	1914	1915	854	30.67	4–4"		8
Winslow	1913	1915	832	29.05	4–4"		8
Aylwin	1912	1914	819	29.6	4–4"		8
Balch	1912	1914	819	29.62	4–4"	1–3"	8
Benham	1912	1914	819	29.59	4–4"		8
Total built (213)			217,503				
Building:							
None.							
Appropriated for:							
None.							
Authorized:[1]							
Grand total (213)[1]			217,503[1]				

British Empire

Name	Laid down	Completed	Standard displacement (tons)	Speed	Battery: Main	Battery: Anti-aircraft	Torpedo tubes
Built—Continued.							
Total built (150)			157,585				
Building:							
Bulldog	1929	1931	1,330	35	4–4.7"		8
Brilliant	1929	1931	1,330	35	4–4.7"		8
Brazen	1929	1931	1,330	35	4–4.7"		8
Boreas	1929	1931	1,330	35	4–4.7"		8
Boadicea	1929	1931	1,330	35	4–4.7"		8
Blanche	1929	1931	1,330	35	4–4.7"		8
Beagle	1929	1931	1,330	35	4–4.7"		8
Basilisk	1929	1931	1,330	35	4–4.7"		8
Keith	1929	1931	1,330	35	4–4.7"		8
Saquenay	1929	1931	1,328	35	4–4.7"		8
Skeena	1929	1931	1,328	35	4–4.7"		8
Acheron	1928	1930	1,330	35	4–4.7"		8
Antony	1928	1930	1,330	35	4–4.7"		8
Arrow	1928	1930	1,330	35	4–4.7"		8
Ardent	1928	1930	1,330	35	4–4.7"		8
Antelope	1928	1930	1,330	35	4–4.7"		8
Active	1928	1930	1,330	35	4–4.7"		8
Achates	1928	1930	1,330	35	4–4.7"		8
Acasta	1928	1930	1,330	35	4–4.7"		8
Codrington	1928	1930	1,520	35	5–4.7"		8
Total building (20)			26,786				
Appropriated for:							
1			1,390				
2			1,375				
3			1,375				
4			1,375				
5			1,375				
Total appropriated for (5)			6,890				
Authorized:							
None.							
Grand total (175)			191,261				

[1] 12 destroyers remaining from 1916 program for which no funds for construction are available are excluded.

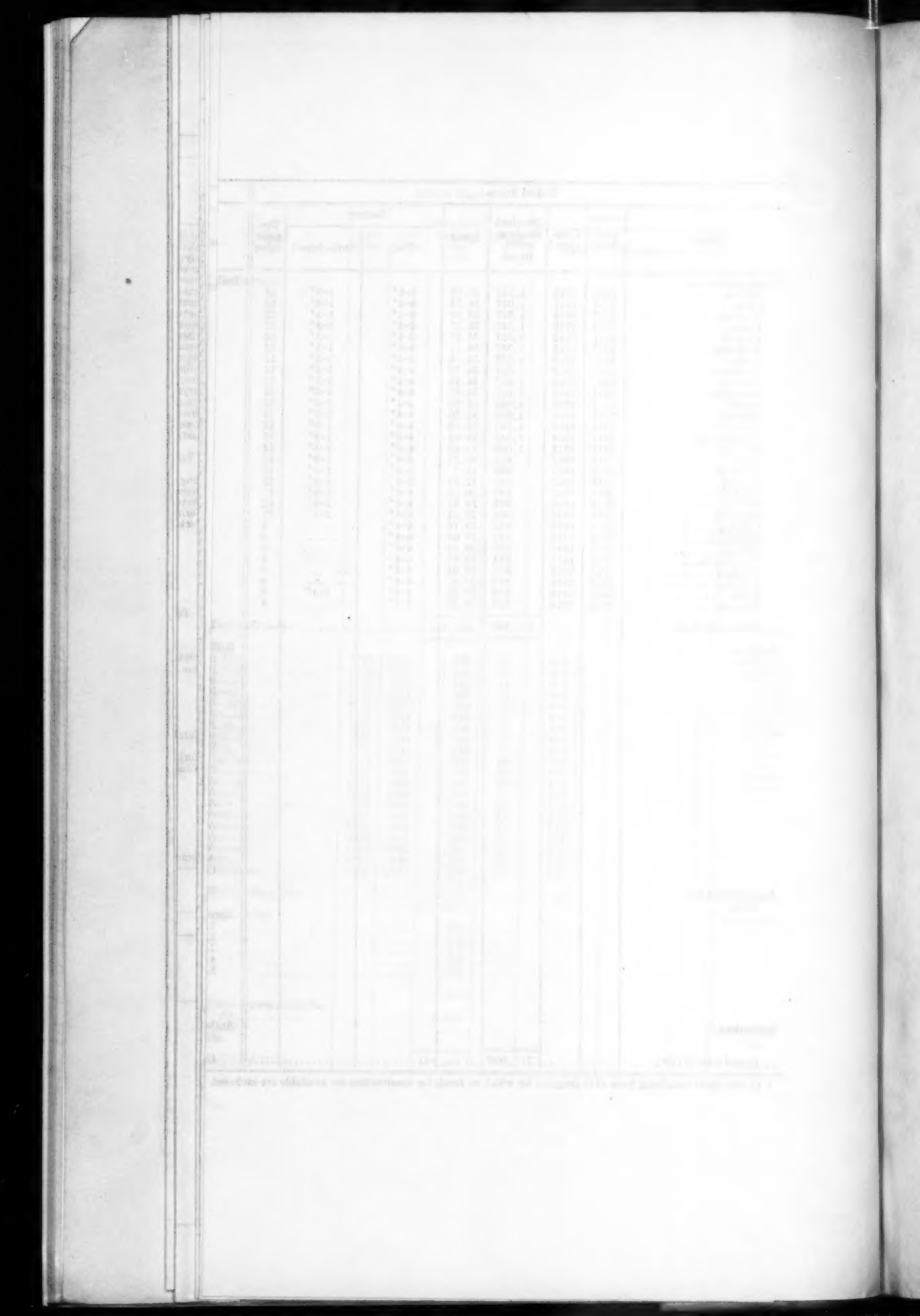
DESTROYERS (UNDER EFFECTIVE AGE OF 16 YEARS)—Continued

Japan									
Name	Laid down	Completed	Standard displacement (tons)	Speed	Battery		Torpedo tubes	Name	
					Main	Anti-aircraft			
ntinued.								Built—Continued.	
uilt (103)			108,975					Total built (63)	
	1929	1930	1,700	34	6–5.1"		9	Building: Aigle	
	1929	1930	1,700	34	6–5.1"		9	Vautour	
	1928	1930	1,700	34	6–5.1"		9	Albatros	
i	1928	1930	1,700	34	6–5.1"		9	Gerfault	
mi	1930	1931	1,700	34	6–5.1"		9	Milan	
	1929	1931	1,700	34	6–5.1"		9	Epervier	
io	1929	1931	1,700	34	6–5.1"		9	Basque	
	1929	1931	1,700	34	6–5.1"		9	Forbin	
ki	1930	1932	1,700	34	6–5.1"		9	Foudroyant	
	1930	1932	1,700	34	6–5.1"		9	Frondeur	
ni	1930	1932	1,700	34	6–5.1"		9	Vauban	
a	1930	1932	1,700	34	6–5.1"		9	Lion	
								Bison	
								D-10	
								D-11	
								D-12	
								D-13	
								D-14	
								D-15	
uilding (12)			20,400					Total building (19)	
ed for:								Appropriated for: D-21	
								D-20	
								D-19	
								D-18	
								D-17	
								D-16	
								Total appropriated for (6)	
:								Authorized: None.	
otal (115)			129,375					Grand total (88)	

[1] Does not inlude 61 destroyer

France								Italy							
Name	Laid down	Completed	Standard displacement (tons)	Speed	Battery		Torpedo tubes	Name	Laid down	Completed	Standard displacement (tons)	Designed speed	Battery		Torpedo tubes
					Main	Anti-aircraft							Main	Anti-aircraft	
tinued.								Built—Continued.							
ilt (63)			73,493					Total built (78)			73,802				
	1928		2,440	36	5–5.5"	1–3"	6	Building:							
	1929		2,440	36	5–5.5"	1–3"	6	Folgore	1929		1,220	38	4–4.7"/45	3–1.8"	6
	1929		2,440	36	5–5.5"	1–3"	6	Lampo	1929		1,220	38	4–4.7"/45	3–1.8"	6
	1929		2,440	35.9	5–5.5"	1–3"	6	Baleno	1929		1,220	38	4–4.7"/45	3–1.8"	6
	1929		2,440	36	5–5.5"	1–3"	7	Fulmine	1929		1,220	38	4–4.7"/45	3–1.8"	6
	1929		2,440	36	5–5"	1–3"	7	Saetta	1929		1,205	38	4–4.7"/45	3–1.8"	6
	1926		1,377	33	4–5.1"	2–1.5"	6	Freccia	1929		1,205	38	4–4.7"/45	3–1.8"	6
	1927		1,377	33	4–5.1"	2–1.5"	6	Strale	1929		1,205	38	4–4.7"/45	3–1.8"	6
ant	1927		1,377	33	4–5.1"	2–1.5"	6	Dardo	1929		1,205	38	4–4.7"/45	3–1.8"	6
	1927		1,377	33	4–5.1"	2–1.5"	6	Antonio Pigafetta	1927		1,628	38	6–4.7"	2–1.6"	6
	1927		2,436	35.5	5–5.5"	4–1.5"	6	Alvise Cadamosto	1927		1,628	38	6–4.7"	2–1.6"	6
	1926		2,436	35.5	5–5.5"	4–1.5"	6	Giov. Da Verrazano	1927		1,628	38	6–4.7"	2–1.6"	6
	1927		2,436	35.5	5–5.5"	4–1.5"	6								
			2,440	36		1–3"	7								
			2,440												
			2,440												
			2,440												
			2,440												
			2,440												
lding (19)			42,096					Total building (11)			14,584				
l for:								Appropriated for:							
			2,569					None.							
			2,569												
			2,569												
			2,569												
			2,569												
			2,569												
ppropriated for			15,414												
								Authorized: None.							
al (88)			131,003					Grand total (89)			88,386				

ude 61 destroyers, (63,991 tons) on disposal list and 10 Coast Guard destroyers (8,810 tons).



United States								British Empire								
Name	Laid down	Completed	Standard displacement (tons)	Speed	Battery		Torpedo tubes	Name	Laid down	Completed	Standard displacement (tons)	Speed	Battery		Torpedo tubes	N
					Main	Anti-aircraft							Main	Anti-aircraft		
Cassin (Coast Guard)	1912	1913	803	30.14	4–4"		8	Warrego[1]	1910	1911	565	26.5	1–4"		3	
Cummings (Coast Guard)	1912	1913	803	30.57	4–4"		8	Yarra[1]	1909	1910	565	27	1–4"		3	Tachibana
Duncan	1912	1913	797	29.14	4–4"	1–3"	8	Parramatta[1]	1909	1910	565	26	1–4"		3	Sakura
Parker	1912	1913	819	29.55	4–4"		8									
Beale (Coast Guard)	1911	1912	649	29.65	4–3"		6									Yamakaze[2]
Fanning (Coast Guard)	1911	1912	649	29.99	4–3"		6									
Henley (Coast Guard)	1911	1912	649	30.32	4–3"		6									Umikaze[2]
Jarvis	1911	1912	649	30.01	5–3"		6									
Jenkins	1911	1912	649	31.27	5–3"		6									
Jouett (Coast Guard)	1911	1912	649	32.27	4–3"		6									
Ammen (Coast Guard)	1910	1911	649	30.48	4–3"		6									
Burrows (Coast Guard)	1909	1911	649	30.67	4–3"		6									
Mayrant	1909	1911	649	30.22	5–3"		6									
McCall (Coast Guard)	1909	1911	649	30.66	4–3"		4									
Monaghan (Coast Guard)	1910	1911	649	30.45	4–3"		6									
Patterson (Coast Guard)	1910	1911	649	29.69	4–3"		6									
Trippe (Coast Guard)	1909	1911	649	30.89	4–3"		6									
Walke	1910	1911	649	29.78	5–3"		6									
Warrington	1909	1911	649	30.12	4–3"		6									
Roe (Coast Guard)	1909	1910	649	29.60	4–3"		4									
Terry (Coast Guard)	1909	1910	649	30.24	4–3"		6									
Drayton	1909	1910	649	30.83	5–3"		6									
Perkins	1909	1910	649	29.76	5–3"		6									
Sterrett	1909	1910	649	30.37	4–3"		6									
Paulding (Coast Guard)	1909	1910	649	32.80	4–3"		6									
Total 25			16,851					Total (3)			1,695					Total (4)

[1] Listed for disposal.

[2] These vess

DESTROYERS (OVER EFFECTIVE AGE OF 16 YEARS)

British Empire						Japan							
Com-leted	Standard displace-ment (tons)	Speed	Battery		Tor-pedo tubes	Name	Laid down	Com-pleted	Standard displace-ment (tons)	Speed	Battery		Tor-ped tub
			Main	Anti-aircraft							Main	Anti-aircraft	
911	565	26.5	1–4″	.....	3	Tachibana.....	1911	1912	530	31	1–4.7″ 4–3″	.....	4
910	565	27	1–4″	.....	3								
910	565	26	1–4″	.....	3	Sakura.....	1911	1912	530	31	1–4.7″ 4–3″	.....	4
						Yamakaze[3].....	1910	1911	1,030	33	2–4.7″ 5–3″	.....	4
						Umikaze[3].....	1909	1911	1,030	33	2–4.7″ 5–3″	.....	4
....	1,695	.....	.....	.....	.....	Total (4).....	.....	.....	3,120	.....	.....	.....	....

[3] These vessels reported converted to Mine Sweepers, April, 1930.

...y ...nti-aircraft	Tor-pedo tubes	France — Name	Laid down	Com-pleted	Standard displace-ment (tons)	Speed	Battery — Main	Battery — Anti-aircraft	Tor-pedo tubes	Italy — Name	Laid down	Com-pleted	Standard displace-ment (tons)	Speed	Battery — Main	Battery — Anti-aircraft	Tor-pedo tubes
.....	4	Bisson	1910	1913	680	31	2–3.9″ 4–2.6″	.....	4	Indomnito	1910	1913	541	35.8	5–4″	1–1.6″	4
.....	4	Commandant Riviere	1910	1913	680	26	2–3.9″ 4–2.6″	.....	4	Irrequieto	1910	1913	541	35.8	5–4″	1–1.6″	4
.....	4	Bouclier	1908	1912	630	35.3	2–3.9″ 4–2.6″	1–3″	4	Impavido	1911	1913	541	35.8	1–4″ 4–3″	.....	4
.....	4	Aspirant Herbert	1910	1912	453	28.2	6–2.6″	.....	3								
		Dehorter	1910	1910	700	29.3	2–3.9″ 4–2.6″	.....	4								
		Glaive	1907	1910	315	28	1–2.6″ 4–1.9″	.....	1								
		Trident	1906	1909	315	28	1–2.6″ 4–1.9″	.....	1								
.....	.....	Total (7)	.....	.....	3,773	.....	.....	.....	.....	Total (3)	.....	.....	1,623	.....	.....	.....	.....

United States

Name	Laid down	Completed	Standard surface displacement (tons)	Speed		Guns	Torpedo tubes
				Surface	Submerged		
Built:							
V-4	1925	1928	2,660	14.6	8	2-6"	4
V-3	1921	1926	1,910	19.25	8	1-5"	6
S-44	1921	1925	850	14	10.4	1-4"	4
S-45	1920	1925	850	14	10.4	1-4"	4
S-46	1921	1925	850	14	10.4	1-4"	4
S-47	1921	1925	850	14	10.4	1-4"	4
V-2	1921	1925	1,910	18.75	8	1-5"	6
S-18	1918	1924	800	14.5	11	1-4"	4
S-22	1919	1924	800	14.5	11	1-4"	4
S-27	1919	1924	800	14.5	11	1-4"	4
S-29	1919	1924	800	14.5	11	1-4"	4
S-41	1919	1924	800	14.5	11	1-4"	4
S-42	1920	1924	850	14	10.4	1-4"	4
S-43	1920	1924	850	14	10.4	1-4"	4
V-1	1921	1924	1,910	18.75	8	1-5"	6
S-11	1919	1923	790	14.75	9	1-4"	5
S-12	1920	1923	790	14.75	9	1-4"	5
S-13	1920	1923	790	14.75	9	1-4"	5
S-19	1918	1923	800	14.5	11	1-4"	4
S-21	1918	1923	800	14.5	11	1-4"	4
S-23	1919	1923	800	14.5	11	1-4"	4
S-24	1918	1923	800	14.5	11	1-4"	4
S-25	1918	1923	800	14.5	11	1-4"	4
S-26	1918	1923	800	14.5	11	1-4"	4
S-28	1919	1923	800	14.5	11	1-4"	4
S-31	1918	1923	800	14.5	11	1-4"	4
S-32	1918	1923	800	14.5	11	1-4"	4
S-34	1918	1923	800	14.5	11	1-4"	4
S-35	1918	1923	800	14.5	11	1-4"	4
S-36	1918	1923	800	14.5	11	1-4"	4
S-37	1918	1923	800	14.5	11	1-4"	4
S-38	1919	1923	800	14.5	11	1-4"	4
S-39	1919	1923	800	14.5	11	1-4"	4
S-40	1919	1923	800	14.5	11	1-4"	4
S-10	1919	1922	790	14.75	9	1-4"	5
S-20	1918	1922	800	14.5	11	1-4"	4
S-33	1918	1922	800	14.5	11	1-4"	4
S-48	1920	1922	890	14.8	11	1-4"	5
S-9	1919	1921	790	14	9	1-4"	5
S-14	1917	1921	790	15.25	9	1-4"	4
S-15	1917	1921	790	15.25	9	1-4"	4
S-17	1918	1921	790	15.25	9	1-4"	4
S-1	1917	1920	800	14.5	11	1-4"	4
S-6	1918	1920	790	14	9	1-4"	4
S-7	1918	1920	790	14	9	1-4"	4
S-8	1918	1920	790	14	9	1-4"	4
S-16	1918	1920	790	15.25	9	1-4"	4
S-30	1918	1920	800	14.5	11	1-4"	4
S-3	1917	1919	790	.....	.....	1-4"	4
R-2	1917	1919	530	13.5	10.5	1-3"	4
R-3	1917	1919	530	13.5	10.5	1-3"	4
R-4	1917	1919	530	13.5	10.5	1-3"	4
R-5	1917	1919	530	13.5	10.5	1-3"	4
R-6	1917	1919	530	13.5	10.5	1-3"	4
R-7	1917	1919	530	13.5	10.5	1-3"	4
R-8	1918	1919	530	13.5	10.5	1-3"	4
R-9	1918	1919	530	13.5	10.5	1-3"	4
R-10	1918	1919	530	13.5	10.5	1-3"	4
R-11	1918	1919	530	13.5	10.5	1-3"	4
R-12	1918	1919	530	13.5	10.5	1-3"	4
R-13	1918	1919	530	13.5	10.5	1-3"	4
R-14	1918	1919	530	13.5	10.5	1-3"	4
V-5	1927	1930	2,730	17	8.5	2-6"	6

British Empire

Name	Laid down	Completed	Standard surface displacement (tons)	Speed		Guns	Torpedo tubes
				Surface	Submerged		
Built:							
Odin	1927	1929	1,475	17.5	9	1-4"	8
Otus	1927	1929	1,475	17.5	9	1-4"	8
Oswald	1927	1929	1,475	17.5	9	1-4"	8
Osiris	1927	1929	1,475	17.5	9	1-4"	8
Orpheus	1927	1929	1,475	17.5	9	1-4"	8
Olympus	1927	1929	1,475	17.5	9	1-4"	8
Oxley	1925	1927	1,354	15.5	9	1-4"	8
Oberon	1924	1927	1,311	13	9	1-4"	8
Otway	1925	1927	1,349	13.5	9	1-4"	8
L-26	1918	1926	760	17.5	10.5	1-4"	4
L-27	1918	1926	760	17.5	10.5	1-4"	4
X-1	1921	1925	2,425	19.5	9	4-5.2"	6
L-53	1917	1925	845	17.5	10.5	2-4"	6
L-54	1917	1924	845	17.5	10.5	1-4"	6
L-23	1917	1924	760	17.5	10.5	1-4"	4
K-26	1918	1923	1,710	23.5	9	3-4"	10
L-69	1917	1923	845	17.5	10.5	1-4"	6
L-52	1917	1921	845	17.5	10.5	2-4"	6
L-22	191.	1921	760	17.5	10.5	1-4"	6
L-21	1917	1920	760	17.5	10.5	1-4"	4
L-25	1918	1920	760	17.5	10.5	.....	4
L-71	1917	1920	845	17.5	10.5	1-4"	6
M-2	1916	1920	1,450	15	9.5	1-3"	4
M-3	1916	1920	1,450	15.5	9.5	.....	4
H-44	1917	1920	410	13	10.5	.....	4
H-50	1918	1920	410	13	10.5	.....	4
R-4	1917	1919	385	9.5	15	.....	6
L-56	1917	1919	845	17.5	10.5	1-4"	6
L-33	1917	1919	760	17.5	10.5	1-4"	4
L-20	1917	1919	760	17.5	10.5	1-4"	4
L-19	1917	1919	760	17.5	10.5	1-4"	4
L-18	1917	1919	760	17.5	10.5	1-4"	4
H-49	1918	1919	410	13	10.5	.....	4
H-48	1917	1919	410	13	10.5	.....	4
H-43	1917	1919	410	13	10.5	.....	4
H-34	1917	1919	410	13	10.5	.....	4
H-33	1917	1919	410	13	10.5	.....	4
H-32	1917	1919	410	13	10.5	.....	4
H-31	1917	1919	410	13	10.5	.....	4
H-30	1917	1918	410	13	10.5	.....	4
H-28	1917	1918	410	13	10.5	.....	4
H-27	1917	1918	410	13	10.5	.....	4
H-24	1917	1918	410	13	10.5	.....	4
H-23	1917	1918	410	13	10.5	.....	4
L-17	1917	1918	760	17.5	10.5	.....	4
L-16	1916	1918	760	17.5	10.5	1-4"	4
L-15	1916	1918	760	17.5	10.5	1-4"	4
L-14	1917	1918	760	17.5	10.5	1-4"	4
L-12	1917	1918	760	17.5	10.5	1-4"	6
L-11	1917	1918	760	17.5	10.5	1-4"	6
L-5	1916	1918	760	17.25	10.5	1-4"	4
L-4	1916	1918	760	17.25	10.5	1-4"	4
L-3	1916	1918	760	17.25	10.5	1-4"	4

Na
Built:
I-39
I-4
I-37
I-61
I-56
I-60
I-24
I-63
I-58
I-23
I-54
I-22
I-55
RO-31
I-21
I-33
RO-66
I-3
RO-67
I-2
RO-65
I-1
RO-68
I-52
RO-64
RO-63
RO-27
RO-62
I-51
RO-32
RO-30
RO-61
RO-28
RO-29
RO-60
RO-23
RO-59
RO-26
RO-58
RO-22
RO-57
RO-3
RO-4
RO-16
RO-19
RO-5
RO-20
RO-21
RO-56
RO-55
RO-17
RO-18
RO-15
RO-54
RO-53
RO-25
RO-14
RO-24
RO-52
RO-13
RO-51
RO-2
RO-1
RO-12
RO-11
I-62

British Empire					Japan						
Standard surface displacement (tons)	Speed		Guns	Torpedo tubes	Name	Laid down	Completed	Standard surface displacement (tons)	Speed		Guns	Torpedo tubes
	Surface	Submerged							Surface	Submerged		
					Built:							
1,475	17.5	9	1-4"	8	I-59	1927	1930	1,635	19		1-4.7"	8
1,475	17.5	9	1-4"	8	I-4	1926	1929	1,955	17		2-5.5"	6
1,475	17.5	9	1-4"	8	I-57	1927	1929	1,635	19		1-4.7"	8
1,475	17.5	9	1-4"	8	I-61	1926	1929	1,635	19		1-4.7"	6
1,475	17.5	9	1-4"	8	I-56	1926	1929	1,635	19		1-4.7"	8
1,475	17.5	9	1-4"	8	I-60	1927	1929	1,635	19		1-4.7"	8
1,354	15.5	9	1-4"	8	I-24	1926	1928	1,142	14		1-5.5"	4
1,311	15	9	1-4"	8	I-63	1926	1928	1,635	19		1-4.7"	8
1,349	15.5	9	1-4"	8	I-58	1924	1928	1,635	19		1-4.7"	8
760	17.5	10.5	1-4"	4	I-23	1925	1928	1,142	14	10	1-5.5"	4
760	17.5	10.5	1-4"	4	I-54	1924	1927	1,635	19		1-4.7"	8
2,425	19.5	9	4-5.2"	6	I-22	1925	1927	1,142	14	10	1-5.5"	4
845	17.5	10.5	2-4"	6	I-55	1924	1927	1,635	19		1-4.7"	8
845	17.5	10.5	1-4"	6	RO-31	1921	1927	655	13		1-3"	6
760	17.5	10.5	1-4"	4	I-21	1924	1927	1,142	14		1-5.5"	4
1,710	23.5	9	3-4"	10	I-53	1924	1927	1,142	19		1-4.7"	8
845	17.5	10.5	1-4"	6	RO-66	1925	1926	988	16	10	1-3"	6
845	17.5	10.5	2-4"	6	I-3	1923	1926	1,955	17		2-5.5"	6
760	17.5	10.5	1-4"	6	RO-67	1925	1926	988	16	10	1-3"	6
760	17.5	10.5	1-4"	4	I-2	1923	1926	1,955	17		2-5.5"	6
760	17.5	10.5		4	RO-65	1924	1926	988	16	10	1-3"	6
845	17.5	10.5	1-4"	6	I-1	1923	1926	1,955	17		2-5.5"	6
1,450	15	9.5	1-3"	4	RO-68	1924	1925	988	16	10	1-3"	6
1,450	15.5	9.5		4	I-52	1922	1925	1,390	19	10	1-4.7"	8
410	13	10.5		4	RO-64	1923	1925	988	16	10	1-3"	6
410	13	10.5		4	RO-63	1923	1924	988	16	10	1-3"	6
385	9.5	15		6	RO-27	1921	1924	746	16	10	1-3"	4
845	17.5	10.5	1-4"	6	RO-62	1922	1924	988	16	10	1-3"	6
760	17.5	10.5	1-4"	4	I-51	1922	1924	1,390	17	12	1-4.7"	8
760	17.5	10.5	1-4"	4	RO-32	1921	1924	655	13		1-4.7"	4
760	17.5	10.5	1-4"	4	RO-30	1922	1924	655	13		1-4.7"	4
760	17.5	10.5	1-4"	4	RO-61	1922	1924	988	16	10	1-3"	6
410	13	10.5		4	RO-28	1921	1923	746	16	10	1-3"	4
410	13	10.5		4	RO-29	1921	1923	655	13		1-4.7"	4
410	13	10.5		4	RO-60	1921	1923	988	16	10	1-3"	6
410	13	10.5		4	RO-23	1921	1923	735	17	10	1-3"	6
410	13	10.5		4	RO-59	1921	1923	889	17	10	1-3"	4
410	13	10.5		4	RO-26	1921	1923	746	16	10	1-3"	4
410	13	10.5		4	RO-58	1921	1922	889	17	10	1-3"	4
410	13	10.5		4	RO-22	1921	1922	735	17	10	1-3"	6
410	13	10.5		4	RO-57	1920	1922	889	17	10	1-3"	4
410	13	10.5		4	RO-3	1919	1922	682	18	10	1-3"	5
410	13	10.5		4	RO-4	1919	1922	682	18	10	1-3"	5
410	13	10.5		4	RO-16	1920	1922	735	17	10	1-3"	6
760	17.5	10.5		4	RO-19	1920	1922	735	17	10	1-3"	4
760	17.5	10.5	1-4"	4	RO-5	1920	1922	682	18	10	1-3"	5
760	17.5	10.5	1-4"	4	RO-20	1919	1922	735	17	10	1-3"	6
760	17.5	10.5	1-4"	4	RO-21	1919	1922	735	17	10	1-3"	6
760	17.5	10.5	1-4"	6	RO-56	1920	1922	893	17	10	1-3"	6
760	17.5	10.5	1-4"	6	RO-55	1920	1921	893	17	10	1-3"	6
760	17.25	10.5	1-4"	4	RO-17	1920	1921	735	17	10	1-3"	6
760	17.25	10.5	1-4"	4	RO-18	1920	1921	735	17	10	1-3"	6
760	17.25	10.5	1-4"	4	RO-15	1920	1921	736	17	10	1-3"	6
					RO-54	1919	1921	893	17	10	1-3"	6
					RO-53	1919	1921	893	17	10	1-3"	4
					RO-25	1920	1921	735	17	10	1-3"	4
					RO-14	1918	1921	736	17	10	1-3"	6
					RO-24	1919	1920	735	17	10	1-3"	6
					RO-52	1918	1920	893	17	10	1-3"	6
					RO-13	1918	1920	736	17	10	1-3"	6
					RO-51	1918	1920	893	17	10	1-3"	6
					RO-2	1918	1920	686	13	10		5
					RO-1	1917	1920	686	13	10		5
					RO-12	1917	1919	717	18	10	1-3"	6
					RO-11	1917	1919	717	18	10	1-3"	6
					I-62	1927	1930	1,635	19		1-4.7"	6

France

Name	Laid down	Completed	Standard surface displacement (tons)	Speed		Guns	Torpedo tubes
				Surface	Submerged		
Built:							
Thetis	1924	1929	552	13.7	9.5	1–3.9″	7
Eurydice	1924	1929	576	14.0	9.5	1–3.9″	7
Circe	1924	1929	552	13.5	9.5	1–3.9″	7
Calypso	1924	1929	552	13.5	9.5	1–3.9″	7
Ariane	1923	1929	576	14	9.5	1–3.9″	7
Doris	1924	1929	552	14.2	9.5	1–3.9″	7
Danae	1924	1929	576	13.8	9.5	1–3.9″	7
Caiman	1924	1928	974	15	10	1–3.9″	10
Phoque	1924	1927	974	15	10	1–3.9″	10
Sirene	1923	1927	549	13.9	9.5	1–3.9″	7
Nymphe	1923	1927	549	14.1	9.5	1–3.9″	7
Naiade	1923	1927	549	13.9	9.5	1–3.9″	7
Galatee	1923	1927	549	14	9.5	1–3.9″	7
Morse	1923	1927	974	15	10	1–3.9″	10
Dauphin	1923	1927	974	15.3	10	1–3.9″	10
Espadon	1924	1927	974	15.6	10	1–3.9″	10
Souffleur	1923	1926	974	15.2	10	1–3.9″	10
Narval	1923	1926	974	15.4	10	1–3.9″	10
Marsouin	1922	1926	974	15.3	10	1–3.9″	10
Requin	1922	1926	974	15	10	1–3.9″	10
Pierre Chailley	1917	1925	797	13.5	9	1–3.9″	4
La Place	1913	1924	840	16	10	2–3″	8
Henri Fournier	1914	1923	310	14.2	8.5	1–1.8″	4
O'Byrne	1919	1922	310	14.2	8.5	1–1.8″	4
Maurice Callot	1917	1921	842	16	10.5	1–3″	6
Regnault	1913	1921	840	16	10	2–3″	8
Fulton	1913	1920	838	16.9	10	2–3″	8
Jean Corre	1918	1919	464	11.7	6	1–4.1″	5
Joessel	1913	1919	838	16.9	10	2–3″	8
Rene Audry	1917	1918	1,041	13.4	8.7	1–5.9″	4
Jean Roulier	1918	1918	744	15.3	8.5	1–4.1″	6
Trinite-Schillemans	1918	1918	464	12.7	6	1–4.1″	5
Carissan	1918	1918	464	12	6	1–4.1″	5
Hermione	1912	1918	484	14.9	9	1–3″	8
Amphitrite II	1912	1918	384	14.5	8.5	1–3″	8
Romanzotti	1913	1918	840	15.2	10	2–3″	8
Pierre Marrast	1917	1918	744	15	8.5	1–4.1″	6
Lagrange	1913	1918	840	16	10	2–3″	8
Halbronn	1917	1918	1,841	13.6	.....	2–5.9″	6
Jean Autric	1916	1928	744	15.2	8.5	1–4.1″	6
Leon Mignot	1917	1918	744	15.6	8.5	1–4.1″	6
Amazone II	1913	1917	418	17.2	10.5	.....	4
Bellone	1912	1917	484	15.8	9	1–3″	8
Nereide	1911	1917	722	16.8	10	1–3″	8

Italy

Name	Laid down	Completed	Standard surface displacement (tons)	Speed		Guns	Torpedo tubes
				Surface	Submerged		
Built:							
Luciano Manara	1928	1929	815	17.5	9	1–3.9″	8
Fratelli Bandiera	1928	1929	815	17.5	9	1–3.9″	8
Ciro Menotti	1928	1929	815	17.5	9	1–3.9″	8
Santorre Santarosa	1928	1929	815	17.5	9	1–3.9″	8
Squalo	1928	1929	810	16.5	9	1–3.9″	8
G. Bausan	1925	1929	791	17.5	9	1–4″	6
G. Mameli	1925	1929	769	17	9	1–4″	6
M. Colonna	1925	1929	791	17.5	9	1–4″	6
V. Pisani	1925	1929	791	17.5	9	1–4″	6
T. Speri	1925	1929	769	17	9	1–4″	6
A. Sciesa	1925	1929	1,368	18.5	9	1–4″	6
G. Da Procida	1925	1929	769	17	9	1–4″	6
P. Capponi	1925	1929	769	17	9	1–4″	6
Des Geneys	1926	1929	791	17.5	9	1–4″	6
E. Fieramosco	1926	1929	1,339	19	10	1–4.7″	10
Balilla	1925	1928	1,368	18.5	9	1–4.7″	6
E. Toti	1925	1928	1,368	18.5	9	1–4.7″	6
D. Millelire	1925	1928	1,368	18.5	9	1–4.7″	6
Angelo Emo	1916	1919	779	13.7	10	2–3″	6
Lazzaro Mocenigo	1916	1919	779	13.7	10	2–3″	6
Giacomo Nani	1915	1919	708	14	10	2–3″	6
N-6	1916	1919	261	12.5	8	1–3″/30	2
N-4	1916	1919	261	12.5	8	1–3″/30	2
Pietro Micca	1915	1918	779	13.7	10	2–3″/40	6
Evangelista Torricelli	1915	1918	779	13.7	10	2–3″	6
Luigi Galvani	1915	1918	779	13.7	10	2–3″	6
N-3	1916	1918	261	12.5	8	1–3″/30	2
N-1	1916	1918	261	12.5	8	1–3″/30	2
F-21	1915	1918	242	12.5	8	1–3″/30	2
F-20	1915	1918	242	12.5	8	1–3″/30	2
F-19[1]	1915	1918	242	12.5	8	1–3″/30	2
X-3	1916	1918	388	10.0	.....	1–3″	2
X-2	1916	1918	388	10.0	.....	1–3″	2
H-8	.....	1918	335	12.8	11	1–3″	4
H-7	.....	1918	335	12.8	11	1–3″	4
H-6	.....	1918	335	12.8	11	1–3″	4
F-18	1915	1917	242	12.5	8	1–3″/30	2
F-13	1915	1917	242	12.5	8	1–3″/30	2
F-10[1]	1915	1917	242	12.5	8	1–3″/30	2
F-6	1915	1917	242	12.5	8	1–3″/30	2
H-4	.....	1917	335	12.8	11	1–3″	4
H-3	.....	1917	335	12.8	11	1–3″	4
H-2	.....	1917	335	12.8	11	1–3″	4

[1] On disposal list 1 February 1930.

United States

Name	Laid down	Completed	Standard surface displacement (tons)	Speed		Guns	Torpedo tubes
				Surface	Submerged		
Built—Continued.							
O-3	1916	1918	480	14	10.5	1-3"	4
O-4	1916	1918	480	14	10.5	1-3"	4
O-6	1916	1918	480	14	10.5	1-3"	4
O-7	1917	1918	480	14	10.5	1-3"	4
O-8	1917	1918	480	14	10.5	1-3"	4
O-9	1917	1918	480	14	10.5	1-3"	4
O-10	1917	1918	480	14	10.5	1-3"	4
R-1	1917	1918	530	13.5	10.5	1-3"	4
R-15	1917	1918	530	13.5	10.5	1-3"	4
R-16	1917	1918	530	13.5	10.5	1-3"	4
R-17	1917	1918	530	13.5	10.5	1-3"	4
R-18	1917	1918	530	13.5	10.5	1-3"	4
R-19	1917	1918	530	13.5	10.5	1-3"	4
R-20	1917	1918	530	13.5	10.5	1-3"	4
Total built (77)[1]			58,610				
Building:							
V-6	1927		2,730	17	8.5	2-6"	6
V-7	1930		1,550 (3)	17	8	1-4"	6
Total building (2)			4,280				

British Empire

Name	Laid down	Completed	Standard surface displacement (tons)	Speed		Guns	Torpedo tubes
				Surface	Submerged		
Built—Continued.							
Total built (53)			45,534				
Building:							
Rover	1929	1931	1,475				
Regulus	1929	1930	1,475				
Regent	1929	1930	1,475				
Rainbow	1929		1,475				
Perseus	1928	1930	1,475				
Poseidon	1928	1930	1,475				
Parthian	1928	1930	1,475				
Proteus	1928	1930	1,475				
Pandora	1928	1930	1,475				
Phoenix	1928	1930	1,475				
Total building (10)			14,750				

Nas

Nas
Built—Contin
Total built
Building:
I-64
I-3
I-67
I-66
I-65
Total buil

[1] Does not i

SUBMARINES (UNDER EFFECTIVE AGE OF 13 YEARS)—Continued

British Empire						Japan							
m-pleted	Standard surface displacement (tons)	Speed		Guns	Torpedo tubes	Name	Laid down	Completed	Standard surface displacement (tons)	Speed		Guns	Torpedo tubes
		Surface	Submerged							Surface	Submerged		
						Built—Continued.							
....	45,534	.....	.....	.....	.....	Total built (66)	.....	.....	69,338	.....	.....	.....	.....
						Building:							
931	1,475	.....	.....	.....	.....	I-64	1928	1930	1,635	19	.....	1–4.7"	6
930	1,475	.....	.....	.....	.....	I-5	1929	1932	1,955	17	.....	1–4.7"	6
930	1,475	.....	.....	.....	.....	I-67	1929	1932	1,638	19	.....	1–3.9"	6
....	1,475	.....	.....	.....	.....	I-66	1929	1932	1,638	19	.....	1–3.9"	6
930	1,475	.....	.....	.....	.....	I-65	1929	1932	1,638	19	.....	1–3.9"	6
930	1,475	.....	.....	.....	.....								
930	1,475	.....	.....	.....	.....								
930	1,475	.....	.....	.....	.....								
930	1,475	.....	.....	.....	.....								
930	1,475	.....	.....	.....	.....								
....	14,750	.....	.....	.....	.....	Total building (5)	.....	.....	8,504	.....	.....	.....	.....

[1] Does not include 31 submarines (16,120 tons) listed for disposal and experimental hulk *S-4* (790 to

nued

Guns	Torpedo tubes	France — Name	Laid down	Completed	Standard surface displacement (tons)	Speed: Surface	Speed: Submerged	Guns	Torpedo tubes
		Built—Continued.							
		Total built (44)			31,985				
		Building:							
1–4.7"	6	Ondine	1929		558	14		1–3"	8
1–4.7"	6	Orion	1929		558	14		1–3"	8
1–3.9"	6	Oreade	1929		571	13.7		1–3"	8
1–3.9"	6	Orphee	1929		571	13.7		1–3"	8
1–3.9"	6	Rubis	1929		668	12		1–3"	5
		Phenix	1928		1,379	17		1–3.9"	11
		Pegase	1928		1,379	17		1–3.9"	11
		Protee	1928		1,379	17		1–3.9"	11
		Persee	1928		1,379	17		1–3.9"	11
		Promethee	1929		1,379	17		1–3.9"	11
		Atalante	1928		565	13.7		1–3"	8
		Antiope	1928		571	13.7		1–3"	8
		Amazone	1929		571	13.7		1–3"	8
		Meduse	1928		571	13.7		1–3"	8
		Diane	1928		571	13.7		1–3"	8
		Argonaute	1927		565	14		1–3"	8
		Arethuse	1928		565	14		1–3"	8
		Amphitrite	1928		571	13.7		1–3"	8
		Argo	1927		1,379	17	10	1–3.9"	11
		Acheron	1927		1,379	17	10	1–3.9"	11
		Acteon	1927		1,379	17	10	1–3.9"	11
		Surcouf	1926		2,880	[1]18		2–8"	[1]12
		Monge	1926		1,379	17	10	1–3.9	11
		Fresnel	1927		1,379	17	10	1–3.9"	11
		Archimede	1927		1,379	17	10	1–3.9"	11
		Ajax	1928		1,379	17	10	1–3.9"	11
		Achille	1928		1,379	17	10	1–3.9"	11
		Nautilus	1928		668	12	9	1–3"	5
		Turquoise	1926		668	12	9	1–3"	5
		Poncelet	1927		1,379	17	10	1–3.9"	11
		Saphir	1926		668	12.4		1–3"	5
		Pasteur	1926		1,379	17	10	1–3.9"	11
		Pascal	1926		1,379	17	10	1–3.9"	11
		H. Poincare	1927		1,379	17	10	1–3.9"	11
		Vengeur	1926		1,384	17	10	1–3.9"	11
		Redoubtable	1925		1,384	17	10	1–3.9"	11
		Total building (14)			9,828				

Italy — Name	Laid down	Completed	Standard surface displacement (tons)	Speed: Surface	Speed: Submerged	Guns	Torpedo tubes
Built—Continued.							
Total built (43)			27,248				
Building:							
Jalea	1929		600	16.5	9	1–3.9"	8
Jantina	1929		600	16.5	9	1–3.9"	8
Nautilus	1929		600	16.5	9	1–3.9"	8
Salpa	1929		600	16.5	9	1–3.9"	8
Medusa	1929		600	16.5	9	1–3.9"	8
Argonauta	1929		600	16.5	9	1–3.9"	8
Fisalia	1929		600	16.5	9	1–3.9"	8
Tricheco	1928		810	16.5	9	1–3.9"	8
Delfino	1928		810	16.5	9	1–3.9"	8
Narvalo	1928		810	16.5	9	1–3.9"	8
Luigi							
Settembrini	1928		797	17.5	9	1–3.9"	8
R. Settimo	1928		797	17.5	9	1–3.9"	8
F. Corridoni	1927		802	14	8	1–4"	4
M. Bragadino	1927		802	14	8	1–4"	4

hulk *S-4* (790 tons)

[1] Estimated

United States								British Empire								
Name	Laid down	Completed	Standard surface displacement (tons)	Speed		Guns	Torpedo tubes	Name	Laid down	Completed	Standard surface displacement (tons)	Speed		Guns	Torpedo tubes	
				Surface	Submerged							Surface	Submerged			
Appropriated for:								Appropriated for:								Appropria
V-8			[2] 1,550	17	8	1–4"	6	No. 1			[2] 1,760					None.
V-9			[2] 1,550	17	8	1–4"	6	No. 2			640					
								No. 3			640					
Total appropriated for (2)			3,100					Total appropriated for (3)			3,040					Total a
Authorized: [4]								Authorized:								Authorized
								None.								None.
Grand total (69) [1]			63,370					Grand total (66)			63,324					Grand
L-2 [1]	1914	1916	410	14	10.5	1–3"	4									
L-3 [1]	1914	1916	410	14	10.5	1–3"	4									
L-9 [1]	1914	1916	410	14	10.5	1–3"	4									
L-11 [1]	1915	1916	410	14	10.5	1–3"	4									
H-3 [1]	1911	1914	330	14.1	10.6		4									
K-1 [1]	1912	1914	360	14.1	10.6		4									
K-2 [1]	1912	1914	360	14.1	10.6		4									
K-3 [1]	1912	1914	360	14.1	10.6		4									
K-4 [1]	1912	1914	360	14.1	10.6		4									
K-5 [1]	1912	1914	360	14.1	10.6		4									
K-6 [1]	1912	1914	360	14.1	10.6		4									
K-7 [1]	1912	1914	360	14.1	10.6		4									
K-8 [1]	1912	1914	360	14.1	10.6		4									
H-2 [1]	1911	1913	330	14.1	10.6		4									
Total (14) [1]			5,180 [1]													

[1] Listed for disposal.

[2] Estimated.

[3] Canceled.

[4] (NEFF boat) fo

SUBMARINES (UNDER EFFECTIVE AGE OF 13 YEARS)—Continued

British Empire					Japan							
Standard surface displacement (tons)	Speed		Guns	Torpedo tubes	Name	Laid down	Completed	Standard surface displacement (tons)	Speed		Guns	Torpedo tubes
	Surface	Submerged							Surface	Submerged		
[3] 1,760	.....	.....	.....	.....	Appropriated for:							
640	.....	.....	.....	.....	None.							
640	.....	.....	.....	.....								
3,040	.....	.....	.....	.....	Total appropriated for (0)							
					Authorized:							
					None.							
63,324	.....	.....	.....	.....	Grand total (71)	.....	.....	77,842	.....	.....	.....	.....

SUBMARINES (OVER EFFECTIVE AGE OF 13 YEARS)

[3] Canceled.

[4] (NEFF boat) for which there are no funds available for construction and which will probably never be built.

Torpedo tubes	France								Italy							
	Name	Laid down	Completed	Standard surface displacement (tons)	Speed		Guns	Torpedo tubes	Name	Laid down	Completed	Standard surface displacement (tons)	Speed		Guns	Torpedo tubes
					Surface	Submerged							Surface	Submerged		
	Building—Continued.								Appropriated for:							
	Q-171	1930	.....	1,379	17	.....	.....	11	None.							
	Q-172	1930	.....	1,329	17	.....	.....	11								
	Q-173	1929	.....	668	12	.....	.....	5								
	Q-174	1930	.....	571	.....	.....	.....	.....								
	Q-175	1930	.....	571	.....	.....	.....	.....								
	Q-176	1930	.....	565	.....	.....	.....	.....								
	Q-177	1930	.....	565	.....	.....	.....	.....								
	Q-167	1929	.....	1,379	17	.....	.....	.....								
	Q-168	1929	.....	1,379	17	.....	.....	.....								
	Q-169	1929	.....	1,379	17	.....	.....	.....								
	Q-170	1929	.....	1,379	17	.....	.....	.....								
	Total building (47)	.....	.....	49,785												
	Appropriated for:															
	Q-188	.....	.....	571	.....	.....	.....	.....								
	Q-187	.....	.....	571	.....	.....	.....	.....								
	Q-186	.....	.....	571	.....	.....	.....	.....								
	Q-185	.....	.....	571	.....	.....	.....	.....								
	Q-184	.....	.....	668	.....	.....	.....	.....								
	Q-183	.....	.....	1,379	.....	.....	.....	.....								
	Q-182	.....	.....	1,379	.....	.....	.....	.....								
	Q-181	.....	.....	1,379	.....	.....	.....	.....								
	Q-180	.....	.....	1,379	.....	.....	.....	.....								
	Q-179	.....	.....	1,379	.....	.....	.....	.....								
	Q-178	.....	.....	1,379	.....	.....	.....	.....								
	Total appropriated for (11)	.....	.....	11,226	.....	.....	.....	.....								
	Authorized: None.								Authorized: None.							
.....	Grand total (102)	.....	.....	92,996	.....	.....	.....	.....	Grand total (57)	.....	.....	37,076	.....	.....	.....	.....
	Victor Reveille	1915	1916	681	10.6	8.7	1–4.1″	2								
	Gorgone	1912	1916	484	14.7	9	1–3″	8								
	Armide	1912	1916	418	17.4	10.5	.....	6								
	Daphne	1912	1916	648	15	10	1–3″	10								
	Dupin De Lome	1912	1916	748	16	10	2–3″	8								
	Sane	1913	1916	748	16	10	2–3″	8								
	Atalante II	1912	1915	384	13.6	8.5	.....	8								
	Gustave Zede	1911	1914	772	16	10	.....	8								
	Total (8)	.....	.....	4,883	.....	.....	.....	.....								

ver be built.

[8] Includes 31 submarines (16,120 tons) listed for disposal and experimental hulk *S-4* (790 tons).

The Power *of the* U. S. Fleet

By HENRY CABOT LODGE

This article was printed in the June issue of "Fortune" and by the kind permission of that publication is reprinted here because it contains information data presented in an original way.—ED.

IF THE broad justifications of the Navy are sufficiently obvious, it is certainly true that the degree of the Navy's importance at the present time is still only imperfectly understood. Many a reader of *Fortune* went to school at a time when the United States was, in the large sense, an agricultural country. We were taught that the United States fed itself and had an agricultural surplus which it sent abroad. Manufacturers, of course, there were, but their production fell far short of domestic requirements and had to be supplemented by importations. That relationship is now reversed, for one of the disturbing as well as one of the stimulating facts about the United States is that it changes more rapidly in even its very fundamentals than does any other country of similar size.

So it is that if we were going to school today and were being properly taught, we would see that the United States is a country producing more than it consumes, but requiring constantly increasing imports of both crude materials and foodstuffs. We would learn that one-quarter of our essential raw material imports come from within a 1,000-mile radius of Singapore, which itself is 12,000 standard miles from New York, that the United States today imports more foodstuffs than it exports, that its food exports are little more than twice those of the British Isles, and that its total imports are more than four-fifths of its exports. The simple and wholesome traditions of our early republicanism are still so strong that many Americans do not realize the potency of their own country. They would undoubtedly find it hard to believe that the economic productivity of the United States about equals that of all the nations of Europe west of Russia or that of all other parts of the world lumped together. Having read schoolbooks wherein the primacy and might of Great Britain always loomed as a permanent and unshakable fact, they would be most interested to learn that the external trade of the United States is as world-wide and as great as that of any other single country and that our exports are greater than those of any one nation and may be said to support, directly or indirectly, one-tenth of our population.

In this connection the following figures on the trade of the United States and the United Kingdom are of paramount importance:

FOREIGN TRADE—1900

United States	*United Kingdom*
$2,224,000,000	$4,271,000,000

FOREIGN TRADE—1928

United States	*United Kingdom*
$9,220,000,000	$9,972,000,000

The United Kingdom figures include trade within the Empire, but the American figures do not include all of our sea-borne commerce which, of course, is as vital an element in our maritime problem as our purely foreign trade.

In a campaign speech in Boston, October 16, 1928, Herbert Hoover said:

> We might survive as a nation, though on a lower living standard and wages, if we have to suppress the 9 or 10 per cent of our total production now sold abroad. But our whole standard of life would be paralyzed and much of the joy of living destroyed if we were denied sufficient imports. . . . .
>
> If this happens, we must stagnate and degenerate in civilization. . . . . We could not run an automobile, we could not operate a dynamo or use a telephone were we without imported raw materials from the tropics. . . . . Today we are the largest importers and the second largest exporters of goods in the world. . . . . Our total volume of export translates itself into employment for 2,400,000 families. . . . . And in addition to this, millions more families find employment in the manufacture of imported raw materials.

As has just been said, the true test of naval need is not only foreign trade but external trade, which in the case of the United States includes not only foreign trade but that with Alaska, Hawaii, and Porto Rico. In 1929 this United States external trade was $10,076,000,000. In the same year the external trade of the United Kingdom was $10,016,000,000. Deducting the inland trade of the United States proper with Canada and Mexico, our total external sea-borne trade amounts to about $8,500,000,000, to which should be added some $5,600,000,000 of coastwise and intercoastal trade, making our total sea-borne traffic approximately $14,100,000,000.

These are facts underlying our economic structure. Having conquered our continent, the United States is back again in the position it held in the 1830's and at the time of the Revolution, a position in which her future and her opportunity lay on the sea. Moreover the time may well be approaching when we may say of ourselves what Lord Fisher once said of Great Britain—that our frontiers are the coast lines of the enemy.

It is thus a safe guess that if the United States had been born fifty years ago when men's minds were intent on the development of the land, we should today have no fixed policies or traditions wherewith to guide the attitude of the government toward foreign trade. But because the sea at previous times in our history has been an indispensable channel of prosperity, we find ourselves today with naval traditions and policies sanctified by custom, most of which are well tested by time.

Where business is immediately concerned, the policies are three in number. First, the maintenance of the "open door" in foreign commerce so that Americans may trade on an equal footing with other foreigners abroad. This policy, repeatedly reasserted even in the last ten years, has saved China from dismemberment. Second, protection of American citizens abroad engaged in lawful business for the promotion of commerce. In support of the responsibilities entailed by this policy, we built the U.S.S. *Constitution* and her sister-frigates, fought the French in 1798, the Barbary pirates intermittedly from 1801 to 1816, the British from 1812 to 1815, and the Germans in 1917, officially because of their interference with our rights on the seas.

The third major policy exists to prevent the establishment of European colonies or spheres of influence by European powers in the Western Hemisphere—in other words, the Monroe Doctrine. In this connection it is worth recalling that the late President Roosevelt had to tell the German Ambassador that if the Kaiser persisted in his actions toward Venezuela, he would order the American fleet into the Caribbean; and, as is well known, many of our temporary interventions in Central American affairs have been, incidentally, to prevent other powers from using intervention as a way to secure a foothold.

There are, besides, the essential policies of protecting the Panama Canal, our insular possessions, and Alaska, which, by themselves, would require a Navy of no small dimensions.

Although we take these policies for granted, it is obvious that if we were not able to maintain them, they would be speedily nullified. Where our maximum demand is for trade equality, that of most other nations is for trade privilege. Therefore the maintenance of the "open door" seems just as damaging to others as it seems fair to us. If other nations felt they could "get away with it," they would gladly create special preserves for themselves in those foreign markets which are becoming increasingly important to us. The same is true of protecting American citizens abroad. If it were thought that the American in foreign lands could be trifled with, he would be. And if a European nation concluded that it could establish a profitable dependency in the Americas, it is only natural to believe that it would do so.

Assume, for instance, that instead of our external trade having increased four and one-half fold while Great Britain's increase was merely two and one-half fold, each had increased three and one-half fold. The increment to Great Britain would have probably forestalled her unemployment problem and done much to solve her other economic stringencies—but not necessarily to the economic or political advantage of the United States.

War—Its Risk

To understand the risks of war, we must first understand ourselves. We must realize that we are a trading nation and a gain-loving nation. These two qualities are in harmony with each other. But we are also

a peaceful nation. This is, to be sure, due to the subconscious personal inclination of Americans, but it can also be attributed to the fact that the maintenance of the *status quo* is beyond even the slightest doubt to our immense advantage. If we were in the position of Germany, for instance, and had a strip of foreign territory separating New England and the Middle Atlantic States from the rest of the country, or if we were, like Austria, an impossible economic unit, we might feel differently about the régime of things as they are. We are, however, satisfied with the world as it is, and with good reason. We should not, however, make the common mistake of assuming that because we feel a certain way, others must feel that way too. We have nothing to gain by a war, but others may think that they have.

Broadly speaking, the ways in which the Navy might have to enter actual combat fall under two heads: first, with regard to weak nations; second, with regard to strong ones.

Besides the Caribbean countries, we must occasionally intervene in the East. Marines and bluejackets represent the Navy in China today. It is enough to say that during the past 115 years of our existence, the armed forces of the United States have been landed on foreign soil for the protection of the lives and property of American citizens more than one hundred times. Without a declaration of war, bluejackets and marines have gone ashore from the Ægean Islands to Manchuria and from Mexico to the Falkland Islands.

The chances of trouble where stronger nations are concerned cannot be stated categorically, however real they may be. Our international prowess, however, must make it sufficiently obvious that Mr. William Howard Gardiner was right in applying the term "Insular America" to the United States and in showing that we are in effect a vast mid-oceanic island and not a self-sufficient continent—that we, in short, occupy a central maritime position and have a population which, for the maintenance of its standard of living, will increasingly require the wealth that is drawn from the sea.

Moreover, history shows that the new and rising nation, whether it be the United States today or the Kingdom of Prussia under Frederick the Great, only rises at the expense of others and consequently only after the others have failed in keeping her down. So it is that Sir Esme Howard, the last British Ambassador to the United States, could say a few years ago: "The only possible source of trouble that I can see in the future might arise out of economic competition; it seems to me that the struggle for markets will be more acute and violent than in the past."

It is not only because we are growing in an economic sense that we tread on other people's toes. Our trade prowess is an individual rather than a national matter and the "man on the street" is probably not keenly aware of it. There are, however, such deliberate and conscious policies as our immigration act and our protective tariffs, both of which are extremely irritating to foreign nations and both of which are approved by the majority of Americans.

Moreover, we do not intend to draw in our horns, reduce our trade, and abandon the policies, which are the foundation of our well-being. And in all truth must it be said that as far as the eye can see, no single foreign power is going to try to force us to do so at the present time. A combination of powers, however, is not inconceivable and is historically on the cards. The nations banded together unsuccessfully against Frederick the Great, successfully against Napoleon, and successfully against Imperial Germany. I do not mean by this that we now do or ever shall resemble any of these countries, but it is not at all inconceivable that others might think of us in just such terms. The correctness of a certain view is sometimes not as important as the vigor with which it is held. As Mr. Owen D. Young recently observed, "America is too rich to be loved. She is well enough off to be envied."

What Is an Adequate Navy?

The French, with characteristic logic, speak of the "absolute naval needs" of a nation as though the nation were floating in space removed from any neighbors. In such an enviable position there would be no need for a navy since there would be no trouble-makers. Naval needs are relative and depend in large part on the risks of war entailed by the policies of other powers.

A glance at the United States makes it difficult indeed for anyone to prove that our naval establishment is too big. We are flanked by two huge oceans on either of which we might have to exert our maximum naval effort. The rapid transfer of the fleet

from one coast to the other depends on the Panama Canal, which is probably the most vulnerable place in the world. If we wanted to be perfectly consistent, we would require a Navy on each coast.

But this theoretical maximum has not been the American policy. Instead we have adopted the policy of equality with the strongest—and the strongest navy today is the British Navy. Historically speaking, this is far from an extreme policy. Great Britain in the past acted on the theory of having her Navy stronger than those of all the other navies of the world lumped together, which theory in more recent times became the two-power standard. Our policy of equality with the strongest is, of course, a very great guarantee of security, although it obviously would not be adequate for a war in which we were attacked by several naval powers. It cannot, by any fair standard, be called anything but moderate.

The policy of equality, or parity as it is usually called, has, however, been decided on and was agreed to by Prime Minister MacDonald, who told the United States Senate that as far as Great Britain was concerned we could have parity "heaped up and flowing over." It is therefore pertinent to inquire whether parity, having been agreed to in theory, exists in fact. If this question is to be answered correctly, it must be first realized that sea power, in the established use of the term, does not consist of the fleet alone. Entering into it are two other factors of equal, if not greater, importance. These other two factors are naval bases and the merchant marine, and in both these factors we are vastly inferior to the British.

When Messrs. Hoover and MacDonald speak of Anglo-American parity, therefore, they refer only to fleet parity and not to parity in the fundamental elements of sea power. Fleet parity we shall probably obtain, although we have not got it now, for in January, 1930, the modern vessels of the two fleets stood as follows:

	United States		British Empire	
Class	*Number*	*Tons*	*Number*	*Tons*
Capital ships	18	523,400	20	606,450
Aircraft carriers	3	76,286	5	92,850
Cruisers	11	80,500	54	327,111
Destroyers	223	226,313	150	157,585
Submarines	76	59,738	53	47,421
Total	331	966,237	282	1,231,417

This table does not include ships building, appropriated for, or authorized. The capital ships are determined by the Washington treaty and so are not subject to change. Moreover, we have cruisers under construction, authorized, and appropriated for which would bring us much closer to the British strength in that category. Our large quantity of destroyers may be attributed to the late war when the American fleet acted jointly with the British, and destroyers were essential to protect convoys from submarine attack. These destroyers would be relatively useless to us if we were engaged in a war by ourselves. At the present time large quantities of them are laid up in port.

Big battleships and cruisers are preëminently to our advantage for strategic as well as economic reasons, since a battleship or a long range cruiser can go farther without refueling than can any other type of naval vessel. If we had naval bases all over the world as Great Britain has, this requirement would not arise and small cruisers would do the trick. But we have a trade which extends everywhere, and we must therefore have ships which can go everywhere. Now, naval warfare usually takes one of two forms—either the two fleets meet with their complete complement of battleships, cruisers, destroyers, etc., and hammer away until a decision has been reached, or else dispersed warfare is undertaken against the enemy's commerce. This consists in cruisers wandering around the Seven Seas, capturing or sinking enemy vessels. If a nation has naval bases, these cruisers need not devote a large part of their space to the carriage of fuel and supplies, but if a nation, like the United States, has very few bases, ships must be made large enough to stay at sea for long periods. So it was that before the Washington treaty the United States built several cruisers of about 14,000 tons. But at the Washington conference the limit for cruisers was set at 10,000 tons. Therefore any further reduction from that figure would certainly be to our disadvantage.

Let us assume for purposes of illustration that the United States and Great Britain each wish to maintain two cruisers at the following four stations: Gibraltar, the Cape of Good Hope, Singapore, and Panama. As the preceding quotation has shown, this would take more than eight cruisers each because ships would have to leave the station

for refueling and repairs. The advantage accruing to the power with bases over the power without them may be expressed in the following table:

BRITISH CRUISERS

	On station	*Absent from station*	*Total*
Gibraltar	2	1	3
Cape	2	1	3
Singapore	2	1	3
Panama	2	3	5
Total	8	6	14

AMERICAN CRUISERS

	On station	*Absent from station*	*Total*
Gibraltar	2	3	5
Cape	2	6	8
Singapore	2	2	4
Panama	2	1	3
Total	8	12	20

On such a basis, therefore, twenty American cruisers are the equal of merely fourteen British cruisers. This may perhaps show how difficult a matter it is to determine what parity really is.

Where outlying naval bases are concerned, the United States has seven to the British twenty-six. It is interesting to note that the British have four bases in western Atlantic waters whereas we have none in eastern Atlantic waters. Our outlying bases are either in the Caribbean or in the Far East. In middle and near eastern waters or in the vicinity of Europe or Africa, we have none at all. The question of acquiring more bases has not been considered enough from a strategic standpoint to make a definite opinion possible. From a commercial standpoint, however, there is already something to be said for it. We are becoming more and more independent of foreign bottoms for the carriage of our foreign trade. We have, fortunately, learned that lesson from the World War when our utter dependence on foreign ships was so large a factor in bringing us in. This increasing American merchant marine going into every corner of the globe would undoubtedly profit by having ports of call here and there under the American flag. Human nature being what it is, it is only natural for American ships to get treatment in foreign ports inferior to that received by citizens of the country to which the port belongs. Delays and discrimination are bound to occur, and these cost money.

The third item of sea power is the merchant marine, and here our inferiority to the British is also pronounced. This explains why fleet equality with the strongest does not mean sea power equality with it. Public attention centers on the fleets because war vessels are specially constructed by the government for a special purpose. Where general warfare is concerned they are, however, only a small part of the total. Nearly everything that a nation needs in time of peace is a source of strength in time of war. Food and clothes are indispensable in war, and it was largely because the British and American navies stopped the Germans from getting food that they gave in. Pushing the subject a little further, automobiles and airplanes would be invaluable in time of war, yet no one talks of limiting them because their use in time of peace is so much more obvious to most persons than that of the Navy.

Merchant vessels are in this class—valuable for war but not subject to limitation because of their usefulness in time of peace. But if all navies were abolished, the naval importance of merchant ships, especially when armed, would at once be apparent to everyone. So it is that the more navies are reduced, the more importance attaches to the merchant marine. In the war of the Revolution we had practically no Navy but we had many naval actions fought with commercial vessels.

The research division of the United States Shipping Board shows that Great Britain's ocean-going merchant tonnage is nearly twice that of the United States. Discouraging as this may seem, it is a great deal better than it used to be and should improve still more if Americans take the lessons of recent history to heart. It is interesting to note that in 1830, 89 per cent of our foreign trade was carried in American ships. This fell to 8.7 per cent in 1910 and stood in 1928 at 33.3. Our total number of merchant ships as of January 1, 1930, was 1,695, aggregating 9,526,108 tons as compared with 3,034 British ships aggregating 18,057,236 tons.

Merchant vessels which would be useful in time of war should have an individual gross tonnage of 4,000 tons or over, with a speed of 15 knots. This type might be utilized as cruisers or armed transports. Of this class of ships the United States has 83, with an aggregate tonnage of 884,064, and Great Britain 245, with an aggregate ton-

nage of 3,170,603. Britain thus has a superiority in convertible merchant vessels of about 3 to 1.

In making these constant comparisons between the United States and Great Britain nothing invidious is intended, for it is my conviction that relations between the two great powers have never been as good as they are today. They are made because the two governments have agreed on parity, and parity with the strongest is today the naval policy of the United States. The foregoing, therefore, seems to show that while our two fleets may ultimately be in the ratio of 10 to 10, where naval bases are concerned the ratio is 2.6 to 10 and where merchant marine is concerned the ratio is 3.3 to 10. Instead of having parity in sea power, the average relationship of all three factors, figured on an equal basis, makes the ratio one of 5.3 to 10. Such is the true picture of things as they are—on the assumption that our naval fleets are equal which, as shown above, they are not.

The Cost of the Navy

The question of what a certain governmental activity actually costs is nearly impossible to determine, and the difficulties of doing so with regard to the Navy are well exemplified by the current discussions on how much "we spend for war"—a broad and nearly meaningless phrase. A favorite way of estimating this is to take the total annual expenditures of the federal government and then to add up the service on the national debt, the sums paid for pensions of past wars, and the current War and Navy Department appropriations. These are then called "expenses for war" and amount to about 72 per cent of the federal total.

The question of what the Navy costs should be discussed on a rational rather than on an emotional basis. To begin with, the United States is a federal republic and not a centralized state like France or Great Britain. In those countries the expenses emanating from London or Paris give a fair idea of the total governmental expenses of the nation. The federal figures by no means give an accurate idea of the total governmental expenses of the United States. Our state and local governments, in the aggregate, spend about twice as much as our federal government does.

The latest reliable figures available on the cost of government in the United States are those of the National Industrial Conference Board, Inc., for 1927. The following table shows our federal, state, and local expenditures for 1913 in 1913 dollars and for 1927 in 1927 dollars:

1913	*1927*	*Increase*	*Pct. increase*
Federal:			
$ 692,000,000	$ 4,069,000,000	$3,377,000,000	488
State:			
383,000,000	1,656,000,000	1,273,000,000	332
Local:			
1,844,000,000	6,454,000,000	4,610,000,000	250
$2,919,000,000	$12,179,000,000	$9,260,000,000	317

This somewhat appalling increase in the cost of government is lessened by the fact that the 1927 dollar is worth only a fraction of the 1913 dollar. Using the wholesale price index for 1927 which, according to the Bureau of Statistics of the Department of Labor, is 146.8, the total expenditures for the years 1913 to 1927, in 1927 dollars, are as follows:

1913	*1927*	*Increase*	*Pct. increase*
Federal:			
$1,016,000,000	$ 4,069,000,000	$3,053,000,000	300
State:			
562,000,000	1,656,000,000	1,094,000,000	195
Local:			
2,706,000,000	6,454,000,000	3,748,000,000	139
$4,284,000,000	$12,179,000,000	$7,895,000,000	184

The percentage increase is thus something less than half of what it appeared to be before an allowance was made for the purchasing power of the dollar. So it is that during a period when the population of the United States increased from 96,512,407 to 118,620,000, or 23 per cent, the total costs of government increased by 184 per cent. Where the cost of government had been $44.39 per capita in 1913, it had increased to $102.69 in 1927.

Out of a grand total, therefore, of more than $12,000,000,000, the total military expenditures were $600,000,000, or about 5 per cent. Compare it with the largest governmental expenditures listed here in the order of their size, as given by the National Industrial Conference Board:

Public education	$2,344,000,000
Highways	1,708,000,000
Social welfare	1,108,000,000
Cost of general government	866,000,000
Public services (including postal deficit)	617,000,000

Then compare the increase of some $220,000,000 in our military expenditures with the increase in our governmental expenditures for other purposes of $7,895,000,000. The other expenses have increased thirty-five times as much. Where the general cost of government has gone up 184 per cent, that of our national defense has increased 59 per cent. Putting it in another way, while our military expenditures increased $1.16 per head—and of this only 74 cents per head is for naval expenses—our other expenses increased $62.12 per head. Surely a people whose national wealth is close to $400,000,000,000 and who have spent over $12,000,000,000 on its government as a whole need not be overexercised by this comparatively slight increase in the means of self-protection. And surely those who talk of "the crushing burden of naval armament" cannot be talking of the United States—or they have not taken the trouble to look up the facts, for the facts show naval armaments cost less than 3 per cent of our non-military governmental expenditures.

There is one more consideration with regard to the cost of the Navy which should be mentioned. When expenses "on account of war" are mentioned, it is the custom among certain persons to include the national debt and the pension for veterans of past wars. But does this give a true picture? Of course the pensions would not be paid if the war had not been fought, but it is equally true that they would not be paid at all if the war had been lost and the nation had been either ruined or destroyed. The statisticians can total up the cost of the Civil War as high as they like, but it is safe to say that no total they can reach will look very big when compared with the value of the existence of the United States. The war of the Revolution may have been frightfully expensive, but most Americans will incline to the view that it was on the whole a profitable proposition.

The late war afforded an apt lesson of how expensive it sometimes is to be without an adequate Navy. The cost of the war to the United States is usually estimated at $25,000,000,000. Yet in the words of Colonel Edward M. House, who had probably a closer contact with the underlying facts of the war than any other American, "Given a large and efficient Army and Navy the United States would have become the arbiter of peace and probably without the loss of a single life." Experience eventually converted so pronounced a pacifist as the late President Wilson to the value of a Navy as a peace preservative, somewhat as in the past Thomas Jefferson had also become converted.

In both the small and the large sense, the United States Navy is the protector of American business. Its gunboats on the Yangtze protect the ships of an American oil company, its cruisers off the Shanghai bund mean that American citizens can trade and live peacefully far from home, and its marines in the Caribbean guarantee to the fruit grower and trader as great a degree of justice as natural conditions allow. The presence of an American Navy is assurance to the millions of Americans dependent in one way or another on the automotive business that they will have rubber tires. It insures at a remarkably cheap rate a foreign trade of nearly $10,000,000,000 and overseas interests of some $50,000,000,000—which, by the way, is more than the whole country was worth fifty years ago. Finally, it is the best method yet devised for protecting American civilization, the United States of America, and all the vast, imponderable things which are thus entailed.

SEA TRADE STATISTICS

COMMODITIES OF PEACE

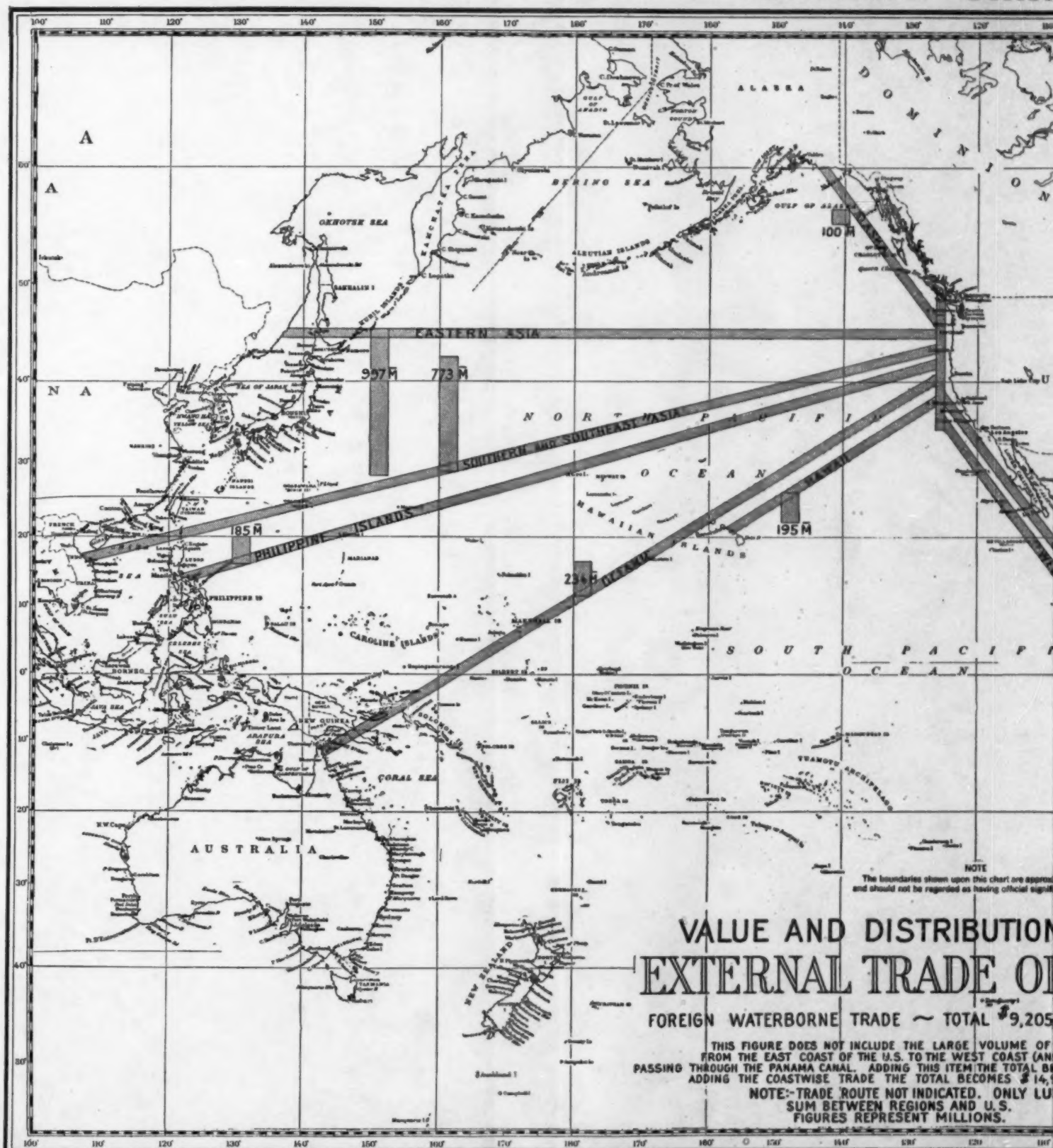
A large industrial nation without free and guarded access to the sea is an organism without space to breathe in. That America is a great exporting country is a truism; that it is also a great importing country is less generally and completely realized. Our imports in 1929 exceeded the four billion mark for the fifth consecutive year; their total value was 7½ per cent higher than in 1928, in spite of the drop in price of nine leading commodities (coffee, sugar, rubber, hides and skins, newsprint paper, crude petroleum, coconut oil, copra, and tin). Record-breaking imports included silk (87,000,000 pounds), crude rubber (1,263,000,000 pounds), newsprint paper (4,845,000,000 pounds), cane sugar (9,770,000,000 pounds), and tin bars and blocks (195,165,000,000 pounds). Follows a table of import and export values for 1929:

Imports		Exports	
Raw silk	$432,340,000	Cotton, unmanufactured	$770,830,000
Coffee	302,397,000	Automobiles, other vehicles	588,023,000
Rubber	247,421,000	Petroleum	561,178,000
Sugar	229,663,000	Grains and preparations	286,354,000
Paper, newsprint	163,184,000	Industrial machinery	277,754,000
Petroleum and products	143,545,000	Tobacco manufactures	165,625,000
Hides, skins	137,281,000	Agricultural machinery	140,801,000
Furs and manufactures	122,529,000	Fruits, nuts	137,467,000
Paper base stocks	118,133,000	Electrical machinery	121,365,000
Copper	104,306,000	Animal oils and fats	117,714,000
Jute and manufactures	95,989,000	Cotton, manufactured	111,216,000
Tin	91,839,000	Sawmill products	110,628,000
Vegetable oils, inedible	91,819,000	Coal and related products	106,151,000
Wool, unmanufactured	87,344,000	Iron and steel manufactures	104,148,000
Fruits and nuts	86,648,000	Steel mill products	96,046,000
Art works	82,106,000	Iron and steel, advanced manufactures	87,003,000
Precious stones, pearls and imitations	79,650,000	Rubber manufactures	76,963,000
Oil seeds	79,335,000	Office appliances	53,754,000
Fertilizers	72,340,000	Leather	42,947,000
Wool manufactures	64,869,000	Wood manufactures	40,934,000
Cotton manufactures	63,454,000	Furs and manufactures	39,504,000
Tobacco and manufactures	60,618,000	Paper manufactures	37,380,000
Sawmill products	54,159,000	Fodders and feeds	32,715,000
Cotton, unmanufactured	53,333,000	Photographic goods	31,566,000
Flax, hemp, etc.	50,890,000	Naval stores, gums, etc.	30,998,000
Vegetables and preparations	47,797,000		
Leather	44,559,000		

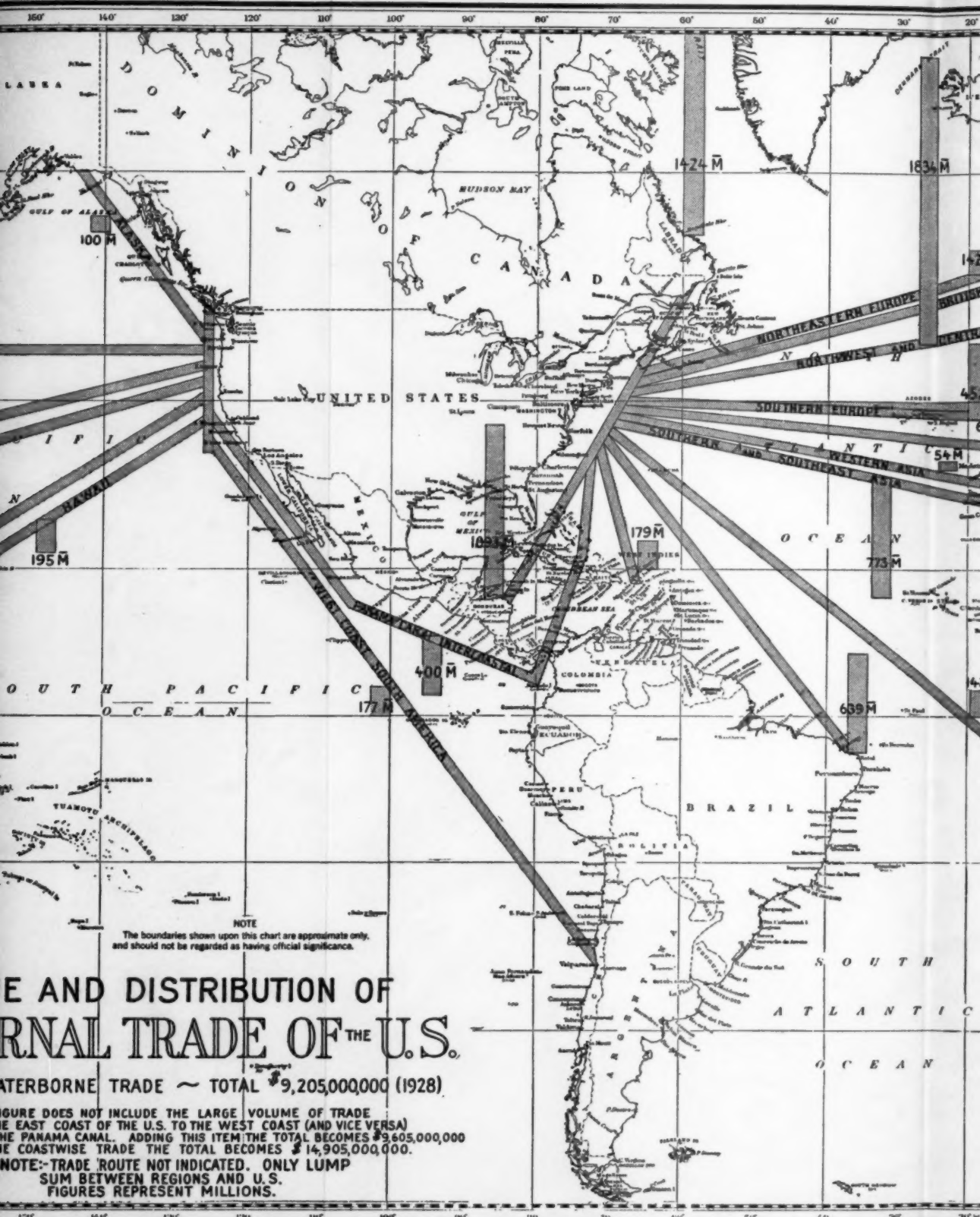
COMMODITIES OF WAR

Better able to support ourselves than France or England, we are far from self-sufficient in peace or war. *Fortune* prints, for the first time, an official tabulation of war-time necessities together with the countries of their origin.

Trade Region	*Percentage of U.S. Supply from This Region*	*Military Use*
Asia, East Indies		
Antimony	67	Munitions, bearings
Camphor	96	Aircraft, medicinal uses
Jute	86	Sandbags, food containers
Manila fiber	100	Cordage, rigging, ropes
Rubber	85	Tires, gas masks, boots, etc.
Shellac	86	Varnish for fuses, electrical devices
Silk	90	Cartridge bags, parachutes
Tin	66	Food containers, bearings, etc.
Manganese	14	Steel, chemicals, batteries


ALASKA
BERING SEA
OKHOTSK SEA
EASTERN ASIA
997 M
773 M
100 M
185 M
195 M
236 M
SOUTHERN AND SOUTHEAST ASIA
PHILIPPINE ISLANDS
HAWAIIAN ISLANDS
CAROLINE ISLANDS
CORAL SEA
AUSTRALIA
NEW ZEALAND
NORTH PACIFIC OCEAN
SOUTH PACIFIC OCEAN
NOTE
VALUE AND DISTRIBUTION
EXTERNAL TRADE OF
FOREIGN WATERBORNE TRADE ~ TOTAL $9,205
THIS FIGURE DOES NOT INCLUDE THE LARGE VOLUME OF
FROM THE EAST COAST OF THE U.S. TO THE WEST COAST (AN
PASSING THROUGH THE PANAMA CANAL. ADDING THIS ITEM THE TOTAL BE
ADDING THE COASTWISE TRADE THE TOTAL BECOMES $ 14,
NOTE:-TRADE ROUTE NOT INDICATED. ONLY LU
SUM BETWEEN REGIONS AND U.S.
FIGURES REPRESENT MILLIONS.

OUTLINE CHART OF THE WORLD



NOTE

The boundaries shown upon this chart are approximate only, and should not be regarded as having official significance.

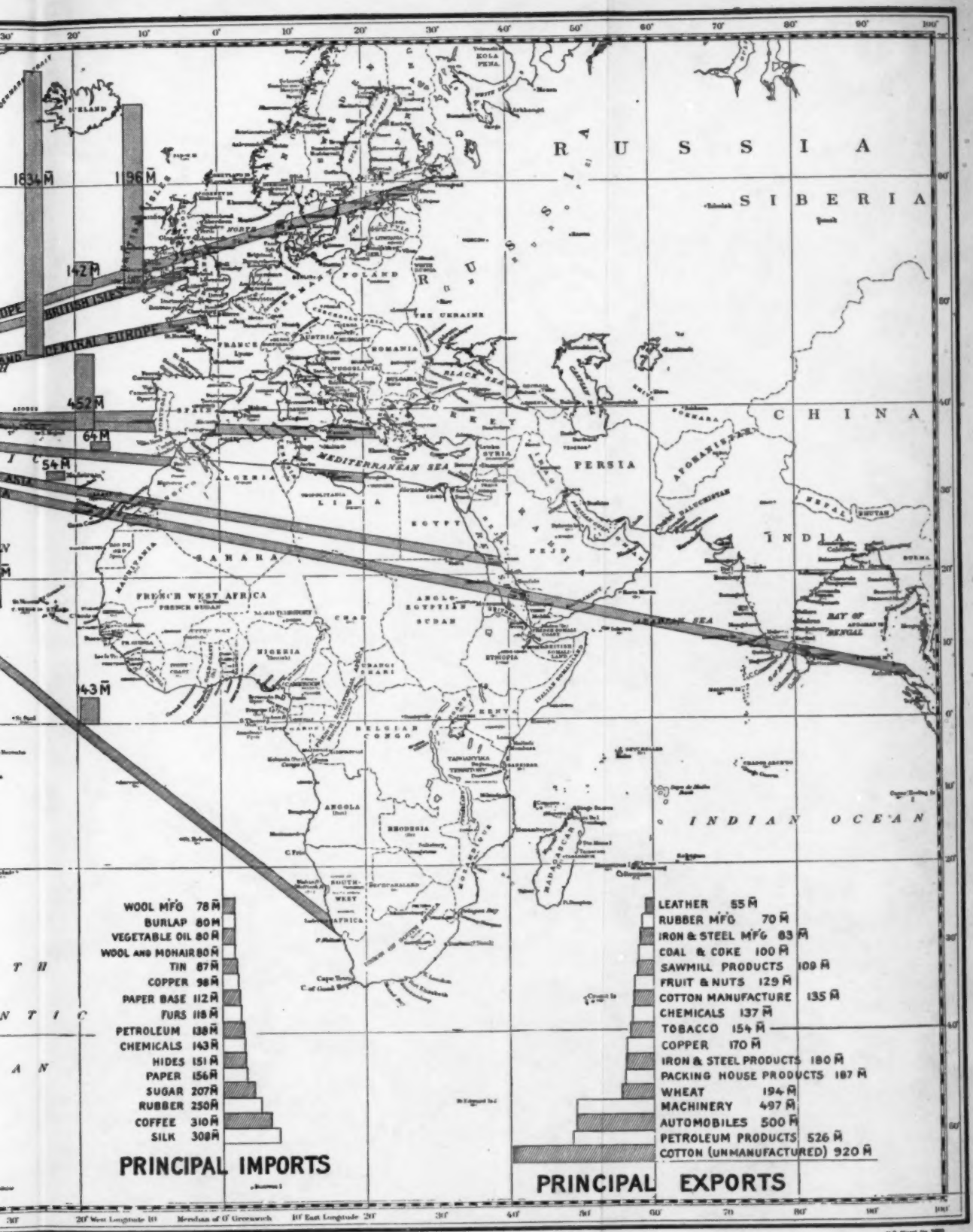
E AND DISTRIBUTION OF
RNAL TRADE OF THE U.S.

ATERBORNE TRADE ~ TOTAL $9,205,000,000 (1928)

IGURE DOES NOT INCLUDE THE LARGE VOLUME OF TRADE
IE EAST COAST OF THE U.S. TO THE WEST COAST (AND VICE VERSA)
HE PANAMA CANAL. ADDING THIS ITEM THE TOTAL BECOMES $9,605,000,000
IE COASTWISE TRADE THE TOTAL BECOMES $14,905,000,000.

NOTE:-TRADE ROUTE NOT INDICATED. ONLY LUMP SUM BETWEEN REGIONS AND U.S. FIGURES REPRESENT MILLIONS.

Washington [n.d.] published [ca. 1930] at the Hydrographic Office under the authority of the SECRETARY OF THE NAVY



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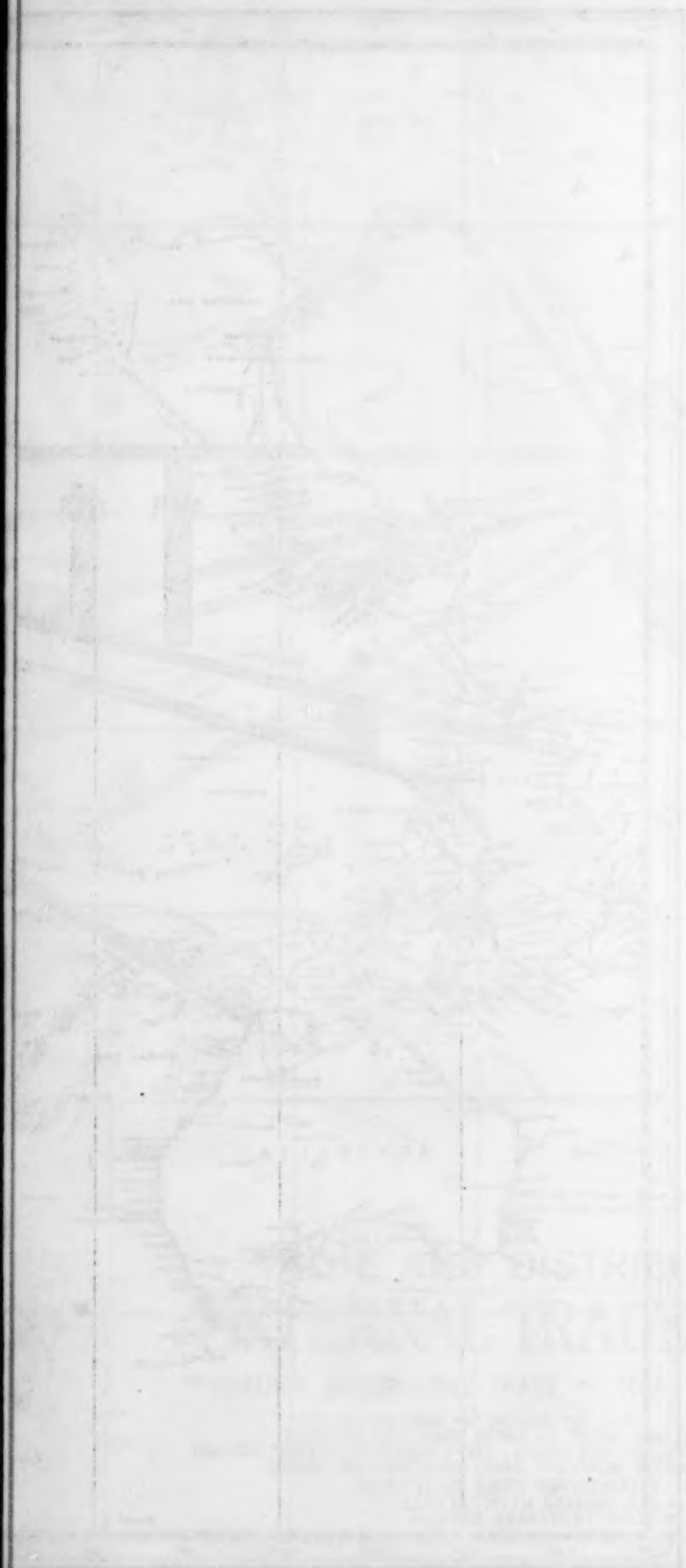


Trade Region	*Percentage of U.S. Supply from This Region*	*Military Use*
EUROPE		
Manganese	30	Steel, chemicals, batteries
Nickel	85	Gun steel, armor plate, ammunition
Quicksilver	51	Fulminate, paint, batteries, medicine
Quinine	81	Medicinal uses
CARIBBEAN		
Coconut shells	92	Absorbent for gas masks
Sugar	61	Food
Sisal	74	Ropes
EAST COAST OF SOUTH AMERICA		
Manganese	22.5	Steel, chemicals, batteries
Coffee	72	Food, stimulant
WEST COAST OF SOUTH AMERICA		
Nitrates	40	Explosives, chemicals
Iodine	76	Medicinal uses

AERONAUTIC ORGANIZATION OF U. S. NAVY FISCAL YEAR 1931

General Subdivisions

I. Fleet Aviation.
  A. U. S. Fleet
    (a) Battle Fleet
    (b) Scouting Fleet
  B. Asiatic Fleet.

II. Naval Districts.

III. U. S. Naval and Marine Corps Reserve Aviation.

IV. Marine Corps.

V. Details for Administration, Training, and Development.

I. Fleet Aviation

A. U. S. FLEET

Assignment of Aircraft and Vessels

Squadron	*Planes*	*Assigned*
Flag Unit	1VJ	Cin C. U.S. Fleet
Ship Unit	3VO	*Texas*

(a) Battle Fleet

(1) Commander Aircraft Squadrons.

Saratoga, Aircraft carrier, first line.

Lexington, Aircraft carrier, first line.

Langley, Aircraft carrier, first line.

Aroostook, Mine layer, second line, for aircraft tender service.

Gannet, Mine sweeper, for plane guard and tender services.

Destroyers as may be detailed from time to time by the commander in chief, Battle Fleet, for plane guard services.

Squadron	*Planes*	*Assigned*
VF-1B	18 VF	*Saratoga*
VF-6B (ex-VB-2B)	18 VF	"
VS-2B	12 VS	"
VT-2B	18 VT	"
Utility Unit	4 VJ	"
VF-3B	18 VF	*Lexington*
VF-5B (ex-VB-1B)	18 VF	"
VS-3B	9 VS	"
VT-1B	18 VT	"
Utility Unit	4 VJ	"
VF-2B	18 VF	*Langley*
VS-1B	9 VS	"
Utility Unit	2 VJ	"
VJ-1B	6 VJ 1 VR	*Aroostook*
VP-7B	6 VP	"
VP-9B	6 NP	"
Flag Unit	1 VJ	Comairrons, B. F,

(2) Commander Battleship Divisions

Squadron	*Planes*	*Assigned*
VO-3B	9 VO	Bat. Div. Three
VO-4B	12 VO	Bat. Div. Four plus *California*
VO-5B	12 VO	Bat. Div. Five
Flag Unit	1 VJ	CinC, Bat. Flt.

(3) Commander Destroyer Squadrons.

Squadron	*Planes*	*Assigned*
VS-4B	2VS	*Omaha*

(b) Scouting Fleet

(1) Commander Aircraft Squadrons.

Wright, Aircraft tender.

Sandpiper, Mine sweeper, for aircraft tender services.

Teal, Mine sweeper, for aircraft tender services.

I. Fleet Aviation *(Continued)*

(b) Scouting Fleet *(Continued)*

Squadron	*Planes*	*Assigned*
VJ-2S	6 VJ 1 VR	*Wright*
VP-8S	6 VP	"
VP-10S	6 VP	"
Wright utility unit	1 VJ	"
Flag unit	1 VJ	Comairrons, Sct. Flt.

(2) Commander Battleship Divisions.

Squadron	*Planes*	*Assigned*
VO-2S	8 VO	Bat. Div. Two plus *Wyoming*
Flag unit	1 VJ	Comdr. Sct. Flt.

(3) Commander Light Cruiser Divisions

Squadron	*Planes*	*Assigned*
VS-5S	8 VS	L.C. Div. Two
VS-6S	8 VS	L.S. Div. Three
VS-9S	20 VS	L.C. Div. Five
VS-10S	12 VS	Light cruisers *Augusta, Chicago,* and *Louisville* (When commissioned).

(4) Commander Destroyer Squadrons.

Squadron	*Planes*	*Assigned*
VS-7S	2 VS	*Concord*

B. Asiatic Fleet

(1) Commander Aircraft Squadrons.

Jason, Collier, for aircraft tender services.

Avocet, Mine sweeper, for aircraft tender services.

Heron, Mine sweeper, for aircraft tender services.

Squadron	*Planes*	*Assigned*
VT-5A	6 VT	*Jason*
VS-8A	6 VS	*Jason*

II. Naval Districts

First Naval District

Naval Air Station or Naval Station	*Squadron or Unit*	*Planes*
Torpedo Station, Newport, R. I.	VX2D1	2 VJ
Naval Air Station, Chatham, Mass.	Inactive	

Fourth Naval District

Naval Air Station, Lakehurst, N. J.	Lighter than air	1 ZR *Los Angeles*
	Training and exp.	2 Zn-J-3, J-4.
	Unit	1 XZMC2
		1 ZK
		2 Free balloons
	Heavier than air	1 VJ
Naval Aircraft Factory, Philadelphia, Pa.	VX3D4	4 VJ
Naval Air Station, Cape May, N. J.	Inactive	

Activities on Severn and Potomac

Naval Air Station, Anacostia, D. C. (Under Bu. Aer. and Comdt. Wash. Navy Yd.)	VX4D5	15 VJ, 3 VR
Naval Proving Ground Dahlgren, Va. (Under Bu. Ordnance)	VX5D5	4 VJ
U. S. Naval Academy, Annapolis Md.	VN8D5	6 VP 2 VJ

Fifth Naval District

Naval Air Station, Hampton Roads, Va.	VN-6D5	15 VN
	VJ-4D5	4 VJ
	VX-1D5	3 VJ

Eighth Naval District

Naval Air Station, Pensacola, Fla.	VN-1D8	77 VN
	VN-2D8	50 VN
	VN-3D8	27 VO-S
		9 VO-S
	VN-4D8	2 VP
	VN-5D8	24 VF
	U.S.S. *Allegheny*	Ocean tug, for aircraft tender services.

Eleventh Naval District

Naval Air Station, San Diego, Calif.	VN-7D11	23 VN
	VJ-5D11	3 VJ 1VR

Fourteenth Naval District

Naval Air Station, Pearl Harbor, T. H.	VT-6D14	12 VT
	VP-1D14	6 VP
	VP-4D14	12 VP
	Utility unit	2 VJ 1 VR
	U.S.S. *Pelican*	Mine sweeper. for aircraft tender services.

Fifteenth Naval District

Naval Air Station, Coco Solo, C. Z.	VT-3D15	18 VT
	VP-2D15	6 VP
	Utility unit	2 VJ 1 VR
	U.S.S. *Swan*	Mine sweeper, for aircraft tender services.

III. U. S. Naval and Marine Corps Reserve Aviation

District	Base	Authorized operating strength	Squadron	Number of division	Remarks
1	NRAB Squantum	9VN-3VO	VN1RD1	3	
			VN2RD1	3	
			VF4MR	2	
3	NRAB Valley Stream, L. I.	9VN-3VO	VN3RD3	3	
			VN4RD3	3	
4	NRAB Philadelphia	3VN-3VO	VN5RD4	1	
5	NRAB Hampton Roads, Quantico,	3VN	VN7RD5	1	For active duty training.
7	NRAB Miami,	6VN	VN8RD7	1	
8	NAS Pensacola	25VN			For advanced training.
9	NRAB Great Lakes	9VN-3VO	VN10RD9	2	
9	NRAB Grosse Ile	3VN-3VO	VN9RD9	2	
			VO7MR	2	
9	NRAB Minneapolis	3VN-3VO	VN11RD9	2	
9	NRAB St. Louis	6VN	VN12RD9	1	
11	NRAB Long Beach	3VN-3VO	VN13RD11	3	
11	NAS San Diego	3VN	U.S.M.C.		For Marine Reserve active training.
12	NRAB Oakland	3VN-3VO	VN14RD12	2	
13	NAS Seattle	9VN-3VO	VN15RD13	3	
			VO8MR	2	
D.C.	NAS Anacostia	3VN-3VO	VN6R	1	

IV. U. S. Marine Corps

For administration:

(a) Aviation Section, Division of Operation and Training, Headquarters, Marine Corps.

(b) Details to Bureau of Aëronautics.

(c) Special details.

For training of personnel:

(a) Details to Naval Air Station, Pensacola, Florida.

(b) Details to Aviation Mechanics' School, Great Lakes, Illinois.

(c) Details to Navy postgraduate courses for instruction in aëronautical subjects.

(d) Details to Army air organizations and Army air schools.

(e) Inactive Marine Flying Field, Parris Island, South Carolina.

Naval Station or U.S.M.C. Station	*Squadron or Unit*	*Planes*	
Marine Barracks, Quantico, Virginia	VF-8M	6 VF	1 VR
	VF-9M	6 VF	1 VR
	VO-6M	6 VO	1 VR
	VO-7M	6 VO	
	VJ-6M	4 VJ	1 VR

West Coast Expeditionary Force

Naval Air Station San Diego, California	VF-10M	6 VF	
	VO-8M	6 VO	
	VO-10M	6 VO	
	VJ-7M	2 VR	

First Brigade U.S.M.C. Haiti

Port au Prince	VO-9M	6 VO	1 VR

Marine Garrison Guam

Guam	VP-3M	6 VS

V. Details for Administration, Development, and Training.

(a) Bureau of Aëronautics.

(b) Details to other bureaus and offices of the Navy Department.

(c) Material inspection details.

(d) Details abroad that involve flying.

(e) Postgraduate details for instruction in aëronautical subjects.

(f) Details to naval training stations, air stations, and units.

(g) Details to Army air organizations, and Army air schools.

The following details involving flying to bureaus and offices exclusive of Bureau of Aëronautics are authorized. No further details involving flying in the Navy Department exclusive of the Bureau of Aëronautics will be made without the authority of the Chief of Naval Operations:

Naval Operations	—Board of Inspection and Survey —1
" "	—Ship Movements Division }
" "	—War Plans Division } —1
" "	—Material Division }
" "	—Fleet Training Division —1
Bureau of Navigation	—Plans Division —1
" " "	—Hydrographic Office —1
" " "	—Naval Observatory —1
Bureau of Engineering	—Radio Division —1
Bureau of Ordnance	—Aircraft Armament —1
Assistant Secretary of the Navy for Aëronautics	—Aide —1

SYLLABUS FOR THE TRAINING OF STUDENT NAVAL AVIATORS AND STUDENT NAVAL AVIATION PILOTS

Flight Course

Primary Seaplane

Stage A—Familiarization.

Period	Time hr.	Type of flight	
—	1.5	—	2 flights, ½ of an hour each; oral explanations only.
			Stage B—Dual Instruction.
1	5	Dual	Taxiing, take-offs, climbs, straight flying, turns, glides, and landings.
2	9	Dual	Quarter spirals from 250 feet and half spirals from 500 feet to landing.
3	1	Dual	Entry into spins and recovery therefrom.
4	.5	Check	Examination on above.
			Stage C—Primary Solo.
5	5	Solo	Practice work of periods 1 and 2.
6	1	Dual	Power landings; spins from skids and recovery therefrom.
7	5	Solo	Practice work of periods 1, 2, and 6.
8	1	Dual	Full spirals, spins from skids.
9	5	Solo	Add full spirals to previous work.
10	.75	Check	Examination on above.
			Stage D—Advanced Solo.
11	1	Dual	Reverse control turns and spirals with spins therefrom.
12	5	Solo	Add maneuvers of period 11.
13	1	Dual	Review of all previous work.
14	5	Solo	Do.
15	1	Dual	Do.
16	5	Solo	Prepare for checks.
17	.75	Check	Examination on above.

SYLLABUS FOR THE TRAINING OF STUDENT NAVAL AVIATORS AND STUDENT NAVAL AVIATION PILOTS *(Continued)*

Flight Course

Primary Seaplane

Stage E—Precision Landings.

Period	Time hr.	Type of flight	
18	1	Dual	Slips, fishtailing, and precision landings.
19	3	Solo	Add work taught in period 18.
20	1	Solo	Precision landing test. Descend by spiraling from 6000 to 3000 feet with closed throttle, then shut off ignition, make 2 complete spirals and effect a normal landing so that plane comes to rest within 200 feet of designated mark.
			Stage F—Final Stage.
21	1	Dual	Wingovers and eights.
22	2	Solo	Add maneuvers of period 21.
23	1	Dual	Further instruction in wingovers and eights.
24	3	Solo	Practice on wingovers and eights.
25	1	Dual	Preparation for final check.
26	3	Solo	Practice for final check.
27	1	Check	Final examination.
			Stage G—Night Flying.
28	.75	Dual	First half dual. Second half to be flown by student with instructor as safety pilot.

Primary Landplane

Stage A—Dual Instruction.

1	10	Dual	Taxing, take-offs, climbs, turns, spirals, glides, landings, spins, and emergencies.
2	.5	Check	Examination on above.
			Stage B—Primary Solo.
3	5	Solo	Practice work of period 1.
4	1	Dual	Precision landings
5	5	Solo	Practice work of period 4.
6	1	Dual	Review, intermediate field work, emergency landings, fishtails, and slips.
7	5	Solo	Practice work of period 6.
8	.5	Check	Examination on above.
			Stage C—Advanced Solo.
9	1	Dual	Wingovers, eights, splits, and loops.
10	5	Solo	Practice work of period 9.
11	1	Dual	Rolls, falling leafs, cartwheels, spins.
12	5	Solo	Practice above.
13	1	Dual	Review periods 9 and 11.
14	5	Solo	Practice work of periods 9, 11, and 13.
15	.5	Check	Examination on above.
			Stage D—Formations.
16	2	Dual	3-Plane formations. Simple "V."
17	5	Solo	Practice work of period 16.
18	1	Dual	"V" to echelon-position shifts.
19	4	Solo	Practice period 18. 6 landings in "V" formation.

SYLLABUS FOR THE TRAINING OF STUDENT NAVAL AVIATORS AND STUDENT NAVAL AVIATION PILOTS *(Continued)*

Flight Course

Primary Landplane

Stage E—Cross Country.

Period	Time hr.	Type of flight	
20	1.5	Dual	Cross-country instruction. Forced landings.
21	1	Solo	Supervisory small-field practice.
22	7.5	Solo	Triangular cross-country flights.
			Stage F—Final.
23	1	Dual-Solo	Student flying from front seat.
24	1	Solo	Review periods 9, 11, and 13.
25	1	Dual	Prepare for final check.
26	1	Solo	Practice period 25.
27	1	Check	Final examination.
			Stage G—Night flying.
28	.5	Dual	Night flying instruction.
29	1	Solo	Night flying. Instructor as safety pilot.

OBSERVATION TRAINING

	Officers	Enlisted men	Radio for officers
	Hours	*Hours*	*Hours*
Stage A—Dual instruction: Normal turns, spirals, precision landings	2	2	.....
Stage B—Solo: Practice stage A plus wingovers, eights, flipper turns, and spirals	8	8	.....
Stage C—Primary formation: 3-and-5 plane "V" formation; 9-plane tactical formation	6	6	.....
Stage D—Primary radio: Student pilot for student radio operator	6	.....	6
Stage E—Formation radio: Student pilot for student radio operator	9	.....	9
Stage F—Spotting: Student pilot for student radio operator; drill at spotting field	6	.....	6
	37	16	21

NOTE.—Total officer time at this stage, 204.25 hours; total enlisted pilot at this stage, 162.25 hours. Officers are designated at this point.

MISCELLANEOUS

	Hours
Stage A—Instrument flying: 3 flights in observation type seaplanes with inclosed cockpits	3.0
Stage B—Catapult: 2 catapult shots and rough water practice in observation type seaplanes	2.5
	5.5

NOTE.—Enlisted men complete course at this point.

ELEMENTARY FIGHTING TRAINING

	Hours
Stage A—Familiarization: Taxiing, take-offs, etc	6.0
Stage B—Section formation: Section "V" and echelon	3.0
Stage C—Precision landings: Landings over a hurdle	2.0
Stage D—Altitude test: Climb in 1 hour	1.0
Stage E—Acrobatics	3.0
Stage F—6-plane division formation	3.0
	18.0

Total flying hours for officers, 227.75 hours; total flying hours for enlisted men, 167.75 hours.

Ground School Syllabus

The ground school courses are conducted during the half days assigned to respective wings of various classes for nonflight activities. These activities comprise theoretical and practical instruction by the following divisions and squadrons of the aviation training school:

Structural division.
Power plant division.
Gunnery division.
Observation plane squadron.

Structural Division

The following courses are presented by the structural division:

a. Aërodynamics.
b. Aircraft construction and equipment.
c. Airplane overhaul.
d. Catapults.
e. General information.
f. Navigation.

General outlines of these courses, with the time allotted to each, follow.

a. Aërodynamics.—General considerations of airfoils and applications of the wind tunnel; parasite resistance; stability; controllability; maneuverability; the propeller; performance and dynamic loads. All students, 8 hours.

b. Aircraft construction and equipment.—Materials; shop processes; shop layout and equipment; organization and management; aircraft instruments, principles of design; construction of parts; assembly and alignment; inspections and tests; airplane maintenance; airplane accessories, including parachutes. Student naval aviators and reserves, 34 hours, student naval aviation pilots, 28 hours.

c. Airplane overhaul.—The complete process of disassembly, cleaning, repairing, replacing parts where necessary, refinishing, assembly, and alignment is performed. Squadron airplanes are received for overhaul and subsequent to reconditioning and flight test are returned to the respective squadrons. Student naval aviators and reserves, 34 hours; student naval aviation pilots, 40 hours.

d. Catapults.—History, development, types, characteristics, construction, maintenance, and inspection. All students except marines, 8 hours.

e. General information.—History and development of aviation; service, foreign, and civil aviation; aërology. All students, 8 hours.

f. Navigation.—Aërial dead reckoning; piloting; astronomical observations, including short methods; navigational instruments. Student naval aviators and student naval aviation pilots, 16 hours; reserves, 52 hours.

Power Plant Division

The following courses are presented by the power plant division:

a. Airplane engines.
b. Test stand and trouble shooting.
c. Engine overhaul.
d. Electricity.
e. Machine shop.

General outlines of these courses, with the time allotted to each, follow.

a. Airplane engines.—General principles, the mechanical system; fuel, lubricating, and cooling systems; the ignition system, including magneto overhaul and test; fuels and oils; service type engines, including assembly, disassembly, and maintenance. All students, 34 hours.

b. Test stand and trouble shooting.—Operation and trouble shooting of air-cooled and water-cooled engines of various service types. All students, 16 hours.

c. Engine overhaul.—Disassembly; cleaning; grinding valves; repair and renewal of defective parts; assembly; alignment; test. All students, 25 hours.

d. Electricity.—Fundamental principles of electricity stressing applicability to ignition circuits. Student naval aviation pilots, 8 hours.

e. Machine shop.—Elementary training in machine shop practice. Student naval aviation pilots, 12.5 hours.

Gunnery Division

The following courses are presented by the gunnery division:

a. Aircraft gunnery.
b. Speed stripping.
c. Bombing.
d. Torpedoes.
e. Range gunnery.

General outline of these courses, with the time allotted to each, follow.

a. Aircraft gunnery.—Familiarization with the Lewis and Browning machine guns; aërial deflection; aërial gun sights, camera gun; care and cleaning; synchronizer gears; accessories. Student naval aviators, 4

hours; student naval aviation pilots and reserves, 8 hours.

b. Speed stripping.—Nomenclature, disassembly, and assembly of Lewis guns. All students, 5 hours.

c. Bombing.—Theory of bombing, description and use of bomb sights, bombing tactics. Student naval aviators and reserves, 4 hours; student naval aviation pilots, 8 hours.

d. Torpedoes.—Description, routine, upkeep and tests of Mark VII torpedoes; torpedo tactics. Student naval aviators, 4 hours; student naval aviation pilots and reserves, 8 hours.

e. Range gunnery.—Sixteen practices with screen and model targets, stationary and moving, using Lewis and Browning guns, the latter being mounted in rocking nacelle; trap shooting. All students, 25 hours.

Observation Plane Squadron

The following ground courses are conducted by this squadron:

a. Radio code squadron:

b. Communication procedure.

c. Radio material.

General outlines of these courses with the time allotted to each follow:

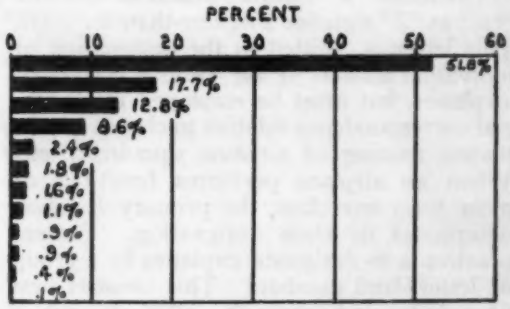
a. Radio Code.—Receiving and sending of continental Morse code; code groups; press. Student naval aviators, 100 hours; student naval aviation pilots and reserves, 80 hours.

b. Communication.—Formulation, sending and receiving despatches; standard and abbreviated procedure; communication instructions. All students, 12 hours.

c. Radio material.—Special requirements and characteristics; theory and operation of spotting sets; care and adjustment. All students, 8 hours.

U. S. NAVAL AVIATION ACCIDENT STATISTICS AND FLYING HOURS

CAUSES OF AIRCRAFT ACCIDENTS



Fiscal year	Flying hours	Fatalities	Fatal accidents	Accidents in which 1st pilot was killed	All crashes	Hours per fatality	Hours per fatal crash	Hours per 1st pilot fatality	Hours per crash
1920–21	37,247	32	17	14	Not known	1,164	2,191	2,518	.....
1921–22	39,808	14	11	8	114	2,843	3,619	4,976	349
1922–23	52,586	24	18	16	121	2,191	2,921	3,287	435
1923–24	58,907	18	11	10	180	3,269	5,355	5,891	326
1924–25	63,791	34	15	11	169	1,876	4,253	5,799	377
1925–26	83,228	19	13	13	188	4,380	6,402	6,402	443
1926–27	103,391	26	19	13	223	3,977	5,436	7,953	463
1927–28	137,286	35	19	18	255	3,922	7,226	7,627	538
1928–29	203,000*	31	19	15	288*	6,548*	10,684*	13,533*	705*

* Approximate

U. S. Naval Aviation Personnel Situation June 30, 1930

*	Naval aviators	614
	Naval aviation observers	9
**	Student naval aviators	184
	Naval aviation pilots	244
	Nonpilots with flying status	45

Model Designation of Naval Airplanes

Naval airplanes are divided into nine classes in accordance with the mission to be performed.

Class	*Designation*
Bombing	VB
Fighting	VF
Ambulance	VH
General utility	VJ
Training	VN
Observation	VO
Patrol	VP
Scouting	VS
Torpedo	VT

The letter "V" signifies a heavier-than-air craft as "Z" signifies a lighter-than-air craft. This letter is omitted in the designation of individual models of the various classes of airplanes, but must be employed in all official correspondence relative to classes of airplanes, naming of airplane squadrons, etc. When an airplane performs functions of more than one class, the primary function determines its class designation. Present practice is to designate airplanes by a group of letters and numbers. This consists first of a letter indicating the class, second, a number indicating the model, and third, a letter indicating the manufacturer, followed by a dash and a number indicating the modification of the model.

In the designation of the first model, the first number (1) is omitted. Thus the Boeing Company's first training plane is the NB-1. When a major alteration, not of a character to change the model, was made in the NB-1, the modified plane was the NB-2. A second modification of the first model would be the NB-3. A second training plane built by this company would be the N2B-1. Similarly the first modification of the N2B-1 would be the N2B-2, and the succeeding modifications would be the N2B-3, etc.

The designation of airplanes of an experimental design shall be prefixed by the letter "X". Airplanes so designated shall retain the prefix while in service in order to indicate that such airplanes were the first of that experimental design series. XF2B-1 indicates that such an airplane is the first of a new series of experimental fighters manufactured by the Boeing Airplane Company, although this design is the second fighter design to be adopted by the Navy. When the new airplane design is accepted for service use and put into production, the prefix in the designation shall be dropped.

The current manufacturer's letters are:

A—Atlantic Aircraft Corp.
B—Boeing Airplane Co.
C—Curtiss A & M Co.
D—Douglas Aircraft Co., Inc.
E—
F—
G—Great Lakes Aircraft Corp.
H—Hall-Aluminum Aircraft Corp.
I—
J—Berliner-Joyce Aircraft Corp.
K—Keystone Aircraft Corp.
L—Loening Aëro. Eng. Corp.
M—Glenn L. Martin Co.
N—Navy Department
O—
P—
Q—Fairchild Aviation Corp.
R—Ford Motor Co.
S—Sikorsky Aviation Corp.
T—New Standard Aircraft Corp.
U—Chance Vought Corp.
V—
W—Wright Aëro. Corp.
X—
Y—Consolidated Aircraft Corp.
Z—

* Includes 22 lighter than air.
** Includes 14 lighter than air.

PROCUREMENT OF AIRPLANES AND AIRPLANE ENGINES, FISCAL YEAR 1930

AIRPLANES

VF, 102:		
F8C-5—	Curtiss fighters with P. & W. Wasp engines	52
F4B-2—	Boeing fighters with P. & W. Wasp engines	46
Bristol—	Bristol Bulldog with Jupiter V11 engine	1
XF5B-1—	Boeing fighter with P. & W. Wasp engine	1
XF9C-1—	Curtiss fighter with Wright Whirlwind engine	1
XFA-1—	Fokker fighter with P. & W. Wasp Jr. engine	1
VO, 54:		
XO2L-1—	Loening amphibian observation with P. & W. Wasp engines	2
O3U-1—	Vought amphibian observation with P. & W. Wasp engines	36
XO4U-1—	Vought amphibian observation with P. & W. Wasp engines	1
OL-9—	Loening amphibian observation with P. & W. Wasp engines	15
VP, 54:		
PK-1—	Keystone patrol flying boat with Wright Cyclone engines	18
XP2S-1—	Sikorsky patrol flying boat with P. & W. Wasp Jr. engines	1
PM-2—	Martin patrol flying boat with Wright Cyclone engines	25
PH-1—	Hall patrol flying boat with Wright Cyclone engines	9
XP2H-1—	Hall patrol flying boat with Curtiss V-1570 engine	1
VT, 20:		
T2D-2—	Douglas torpedo plane with Wright Cyclone engines	18
XT3D-1—	Douglas torpedo plane with Wright Cyclone engine	1
XBN-1—	Navy bomber with P. & W. Hornet engine	1
VS, 1:		
XSL-1—	Loening scouting plane with Warner engine	1
VN, 53:		
NY-3—	Consolidated training plane with Wright Whirlwind engines	20
N2C-2—	Curtiss training plane with Wright Whirlwind engines	20
NT-1—	New Standard training plane with Kinner engines	6
N2Y-1—	Fleet training plane with Kinner engines	6
Glider—	Prubling without engine	1
VR, 3:		
JR-3—	Ford transport plane with P. & W. Wasp engines	2
XJQ-2—	Fairchild utility plane with P. & W. Wasp engine	1
	Total	287
	Cost of airplanes	$6,292,896.59
	Cost of spare parts	1,342,459.11
	Total	$7,635,355.70

ENGINES

R-760—	Wright Whirlwind	50
R-1510—	Wright (14 cylinder)	2
R-1820E—	Wright Cyclone	345
R-975—	Wright Whirlwind	3
V-1110—	Wright	2
R-1860—	Pratt & Whitney Hornet	3
R-370	Kinner—K5	18
R-1340C—	Pratt & Whitney Wasp	3
R-1340D—	Pratt & Whitney Wasp	112
R-985—	Pratt & Whitney Wasp Jr.	4
V-1710—	Allison	1
DR-980—	Packard Diesel	2
VL-2—	Maybach	2
	Comet	1
	Warner "Scarab"	1
	Total	549
	Cost of engines	$3,137,179.75
	Cost of spare parts	715,185.86
	Total	$3,852,365.61

STATUS OF NAVAL AIRCRAFT—JUNE 30, 1930

NAVAL PLANES ON HAND

Service model	Number on hand	Obsolescent model	Number on hand	Experimental model	Number on hand	Obsolete model	Number on hand
				—VF—			
F6C-4	24	FB-5	18	XF3W-1	1	F6C-1	2
F2B-1	24	F6C-3	27	XF8C-2	1	F6C-2	3
F3B 1	63			XF2U-1	1	FU-2	12
F7C-1	14			XFH-1	1		
F4B-1	25			Bristol			
F8C-4	1			Bulldog	1		
				XF8C-4	1		
				XF5B-1	1		
Totals	151		45		7		17
				—VO—			
OC-1	5	OL-6	7	XRO-1	1	UO-1	9
OC-2	13			XOC-3	1		
O2U-1	95						
OL-8	28						
O2U-2	32						
O2U-3	74						
O2U-4	42						
Totals	289		7		2		9
				—VT—			
T2D-1	11	T3M-1	1	XTN-1	1		
T3M-2	63			XT3M-3	2		
T4M-1	91			XT5M-1	1		
TG-1	10						
Totals	175		1		4		
				—VP—			
PN-12	3			XPB-2	1	F5L	2
PN-11	1			XPY-1	1		
PD-1	24			XPH-1	1		
Totals	28				3		2
				—VR—			
PS-3	3			XJO-2	1		
TA-1	2			XPS-2	2		
TA-2	1			XHL-1	1		
TA-3	1						
JR-2	2						
JR-3	3						
Totals	12				4		
				—VN—			
NY-1	57			XDH-60	1	NB-2	1
NY-1B	13			XN2B-1	1		
NY-2	111			XN2Y-1	1		
NK-1	19			XN3Y-1	1		
NY-3	20			NT-1	6		
				N2Y-1	1		
				Glider	1		
Totals	220				12		1
Totals	875		53		32		29
						Grand total.....	989

STATUS OF NAVAL AIRCRAFT—JUNE 30, 1930 *(Continued)*

NAVAL PLANES ON ORDER

Model	Number on contract	Designating numbers	Number delivered	Number not delivered	Tentative allocation of undelivered planes
F8C-5	9	8748–8756	0	9	1 Anacostia then to Marines; 8 to Marines.
F8C-4	27	8421–8447	1	26	26 to ASBF.
F8C-5	9	8448–8456	0	9	Marines.
F8C-5	9	8589–8597	0	9	Marines.
F4B-2	27	8613–8639	0	27	1 Anacostia then to B.F.; 26 to A S B F.
F4B-2	19	8791–8809	0	19	No allocation.
O3U-1	36	8547–8582	0	36	1 Anacostia then to ASBF; 35 to ASBF.
OL-9	15	8733–8747	0	15	Allocation to be made later.
Pk-1	18	8507–8524	0	18	1 Anacostia then to Pearl Harbor; 17 to Pearl Harbor.
PH-1	9	8687–8695	0	9	1 Anacostia then to B.F.; 8 to ASBF.
PM-1	25	8289–8313	0	25	1 Anacostia then to Annapolis; 5 Annapolis; 6 ASSF; 6 ASBF; 3 ASSF; 9 to Coco Solo.
PM-1	5	8477–8481	0	5	
PM-2	25	8662–8686	0	25	1 Anacostia then to B.F.; 3 to B.F.; 1 to Annapolis; 20 to Coco Solo.
P3M-1	9	8412–8420	0	9	1 Anacostia then to ASSF; 8 to ASSF.
TG-1	18	8458–8475	10	8	8 to ASBF.
T2D-2	18	8644–8661	0	18	1 Anacostia then to Coco Solo; 17 to Coco Solo.
Totals	278		11	267	

NAVAL EXPERIMENTAL PLANES ON ORDER

Model	Number	Model	Number	Model	Number
XFJ-1	1	XOK-1	1	XT2N-1	1
XOJ-1	1	XP2M-1	1	XT6M-1	1
XO2L-1	2	XO4U-1	1	XP4N-1	1
XO4U-1	1	XP2S-1	1	XP4N-2	2
XBN-1	1	XSL-1	1	XP2H-1	1
XT3D-1	1	XF9C-1	1	XFA-1	1
				N2Y-1	5

Total on Order not Delivered—292

LIGHTER-THAN-AIR CRAFT ON HAND

14 Free balloons
2 Kite balloons
1 Rigid airship
2 Non-rigid airship.
1 ZMC-2 metal-clad airship

Total..... 20

LIGHTER-THAN-AIR CRAFT ON ORDER

1 ZRS-4
1 ZRS-5
2 Kite balloons
1 Free balloons

Total..... 5

NAVAL RESERVE PLANES ON HAND

Service model	Number on hand	Obsolescent model	Number on hand	Experimental model	Number on hand	Obsolete model	Number on hand
N2C-1	1 (assigned)						
N2C-1	31					UO-1	6
NY-1	17						
NY-1B	3						
NY-2	30						
O2U-1	4						
Total	86						6
On order	N2C-2	20	8526–8545	2 Valley Stream 1 Squantum 3 San Diego 1 Hampton Roads 2 Great Lakes		2 Anacostia 3 Quantico 3 Miami 3 St. Louis	
" "	F8C-5	34	8757–8790	3 Squantum 3 N.A.F. 3 Great Lakes 3 Long Beach 3 Seattle 4 Storage N.A.F.		3 Valley Stream 3 Grosse Ile 3 Minneapolis 3 Oakland 3 Anacostia	
Totals	140						6
		TOTAL.....146		GRAND TOTAL.....1458			

CHARACTERISTICS OF AIRCRAFT CARRIERS AND AIRCRAFT TENDERS

	Saratoga Class	*Langley*	*Wright*	*Aroostook*	Bird class tenders
Tonnage	33,000	14,000	11,500	3,800	950
Length	888′	542′	448′	395′	187′
Beam	106′	65′	58′	52′	35½′
Horsepower	180,000	7,000	6,000	7,000	1,400
Speed (Max.)	34.5	14.5	15	20	14
Draft	30′	27′	24½′	16′	9′9″
Armament	8-8″ 12-5″	4-5″	2-5″ 2-3″	1-5″ 2-3″	....

COMPARATIVE DATA U. S. NAVY RIGID AIRSHIPS

	Los Angeles	*ZRS-4* (Building)
Gas capacity	2,470,000 cu. ft.	6,500,000 cu. ft.
Length	653.3′	785′
Diameter	90.7′	132.9′
Height	104.4′	146.5′
Gross lift	153,000 lbs.	403,000 lbs.
Useful load	60,000 lbs.	182,000 lbs.
No. of engines	5	8
Horsepower	2,000	4,480
Max. speed (knots)	63.5	72.3
Range (50 knots)	3,500	9,180

OFFICIAL WORLD AND UNITED STATES AIR RECORDS

Established under rules and regulations of the Federation Aëronautique Internationale

AIRPLANES

Duration (Closed Circuit)

World Record	*U. S. Record*
Italy—67 hrs. 13 min. U. Maddalena and F. Cecconi. Savoia-Marchetti-Fiat A-22-T. Montecelio—May 30—June 2, 1930.	59 hrs., 19 min. William Brock and Edward Schlee. Bellanca—Wright Whirlwind—220 h.p. San Diego—September 29—October 1, 1928.

Distance (Closed Circuit)

Italy—5,088.27 miles U. Maddalena and F. Cecconi. Savoia-Marchetti-Fiat A-22-T. May 30-June 2, 1930.	2,516.55 miles. Lieuts. Kelly and Macready, U.S.A. T2-Liberty. April 16-17, 1923.

Distance (Airline)

France—4,912.799 miles. Coste and Bellonte. Brequet-Hispano-Suiza. LeBourget to Coulart Sept. 27-29, 1929.	3911 miles Clarence Chamberlin Wright-Bellanca J-5-200 h.p. Roosevelt Field to Isleben June 4-6, 1927.

Altitude

United States—43,166 feet.
Lieut. Apollo Soucek, U.S.N.
Wright Apache—P. and W. 425 h.p.
Anacostia—June 4, 1930.

Maximum Speed

France—278.48 miles per hour. Warrant Officer Bonnett. Ferbois-Hispano Suiza—550 h.p. Istres—December 11, 1924.	266.59 miles per hour. Lieut. A. J. Williams, U.S.N. Curtiss R-2-C-1 Curtiss D-12—500 h.p. Mitchell Field—November 4, 1923.

SEAPLANES

Duration

World Record	*U. S. Record*
United States—36 hrs., 1 min. Lieuts. A. Gavin and A. Soucek, U.S.N. PN-12-2 Wright R-1750 525 h.p. Philadelphia, May 3-5, 1928.	

Distance

France—2,677 miles. M. Mermoz. Latecoere—Hispano-Suiza 600 h.p. Marignane—April 11-12, 1930.	1,569 miles Lieuts. B. J. Connell and H. C. Rodd, U.S.N. PN-10-2 Packard—600 h.p. San Diego—August 15-16, 1927.

Distance (Airline)

France—1,971.731 miles. M. Mermoz. Latecoere—Hispano-Suiza 600 h.p. St. Louis, Senegal, to Natal, Brazil. May 12-13, 1930.	1,841 miles. Comdr. Rodgers and Lieut. Connell, U.S.N. PN-9, 2 Packard 1-A-1500, 500 h.p. San Pablo Bay to point near Hawaii. August 31-September 1, 1925.

Altitude

United States, 38,560 feet. Lieut. Apollo Soucek, U.S.N. Wright Apache—P. and W. 425 h.p. Anacostia, June 4, 1929.	Note: On June 13, 1930, Lieut. Soucek attained 39,140 feet, 76 feet short of a new record recognized by the F.A.I.

Maximum Speed

England—357.723 miles per hour. Squadron Leader A. H. Orlebar R.A.F. Supermarine—Rolls Royce R6. Spithead—September 12, 1929.	245.713 miles per hour. Lieut. J. H. Doolittle, U.S.A. Curtiss, R3C-2 Curtiss V-1400-600 h.p. Baltimore—October 27, 1925.

DEVELOPMENT OF AVIATION IN THE UNITED STATES

YEAR	1918	1919	1920	1921	1922	1923
No. of routes	1	3	5	3	4	5
No. of station stops	2	6	20	19	16	17
Miles of airways	218	930	3,509	3,509	2,738	2,842
Miles of lighted airways	No airways were lighted before 1924.					
Scheduled miles flown		393,066	864,128	1,713,934	1,570,089	1,545,280
Passengers carried	No scheduled passenger routes were operated before 1926					
Average pass. rate per mile						
Mail carried (lbs.)		230,251	441,742	774,387	1,165,807	1,512,197
Revenue to mail contractors	All mail routes were government operated prior to 1926					
Express carried (lbs.)			41,390	123,221	110,663	208,302
Investment of transport co.'s						
Air Mail Appropriations:						
1. P. O. Dept. routes (Fiscal Year)	$100,000	$100,000	$850,000	$1,375,000	$1,425,000	$1,900,000
2. Contract routes (Fiscal Year)						
Value of all aircraft products		$14,372,643		$7,430,824		$13,142,364
Value of planes produced		$8,046,468		$4,133,108		$7,737,069
No. of planes produced		662		302		587
Value of aeronautical exports		$3,464,526	$1,152,649	$472,548	$494,930	$433,558
No. of planes exported					37	48
No. of engines exported					147	80
Approved plane models						
Approved engine models						

YEAR	1924	1925	1926	1927	1928	1929
No. of routes	5	6	16	23	46	Not Available
No. of station stops	20	18	56	54	101	
Miles of airways	3,010	2,813	8,410	9,189	16,667	
Miles of lighted airways	1,472	2,045	3,149	5,745	9,302	
Scheduled miles flown	922,048	5,396,672	4,318,087	5,870,489	10,472,000	
Passengers carried			5,782	8,679	35,000	
Average pass. rate per mile			$0.14	$0.106		
Mail carried (lbs.)	1,638,500	232,513	810,855	1,654,165	3,959,452	
Revenue to mail contractors			$765,549	$2,643,454	$ 7,430,225	
Express carried (lbs.)	71,064	185,664	$ 1,733,090	2,263,580	2,500,000	
Investment of transport co.'s			$ 5,000,000	$7,053,650		
Air Mail Appropriations:						
1. P. O. Dept. routes (Fiscal Year)	$1,500,000	$2,750,000	$ 2,885,000	$ 2,650,000	$ 2,150,000	
2. Contract routes (Fiscal Year)			$ 500,000	$ 2,000,000	$ 2,000,000	
Value of all aircraft products		$12,775,181	$17,694,905	$21,161,853	$63,000,000	
Value of planes produced		$6,673,659	$ 8,871,027	$14,504,990	$42,000,000	
No. of planes produced		789	1,186	1,995	6,000	
Value of aeronautical exports	$798,273	$783,659	$ 1,027,210	$1,903,560	$ 3,651,000	
No. of planes exported	59	80	50	63	170	
No. of engines exported	146	73	297	84	169	
Approved plane models				20	97	
Approved engine models					20	

STATISTICS OF REGULAR AIR TRANSPORT

Country		Route mileage	Miles flown	Passengers carried	Goods carried (tons)	Mails carried (tons)	Total civil aviation budget (approx.) (at av. rate of ex. for the year)	Subsidy (approx.) (at av. rate of ex. for the year)
British Empire:								
(a) Great Britain (including London-India Service)	1929	5,305	1,189,240	28,260	827.80	99.20	$2,320,000	$1,700,000
	1928	2,215(2)	916,210	27,303	730.00	82.90	2,140,000	1,150,000
(b) Canada	1929	6,484	4,200,000	94,800	1,079.46	192.25	3,740,000	(1) 1,220,000
	1928	5,559	2,296,775	54,913	732.70	141.35	3,410,000	(1) 405,000
France	1929	17,200	5,862,907	25,256	1,576.81	147.03		7,000,000
	1928	12,570	4,534,156	19,698	1,138.10	128.30	8,775,000	4,600,000
Germany	1929	16,500	6,571,283	100,114	2,175.64	379.24	6,850,000	2,085,000
	1928	18,000	7,114,000	120,711	2,129.94	344.88	12,900,000	4,940,000
Italy	1929	8,180	1,851,423	25,208	446.00	60.25	3,235,000	3,045,000
	1928	5,688	1,238,000	15,590	223.67	21.42	1,675,000	1,105,000
United States	1929	36,000	20,242,891	165,263	890.00	3,437.50	8,725,000	(1) 18,140,000
	1928	18,460	10,673,000	49,713	825.07	1,813.04	6,670,000	(1) 14,835,000
Japan	1929	2,607	553,779	2,462	5.7	7.4	2,133,000	1,520,000

(1) In these instances the sums given under "subsidy" are the amounts provided for payments to airmail contractors by the post-office and are not included in the "Total civil aviation budget."
(2) Until March 30, 1929, only the Cairo-Basra section of the London-India route was in operation.

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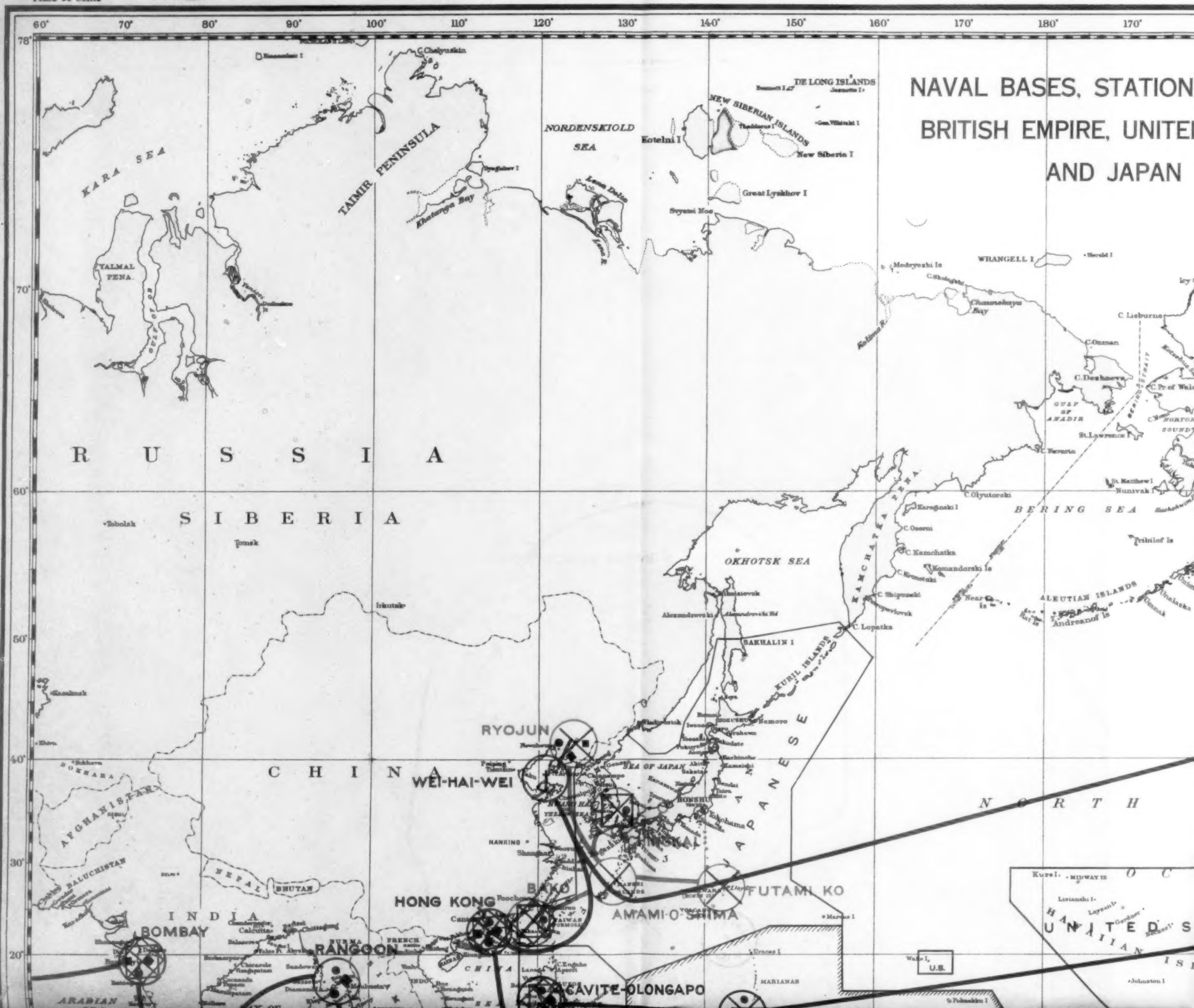
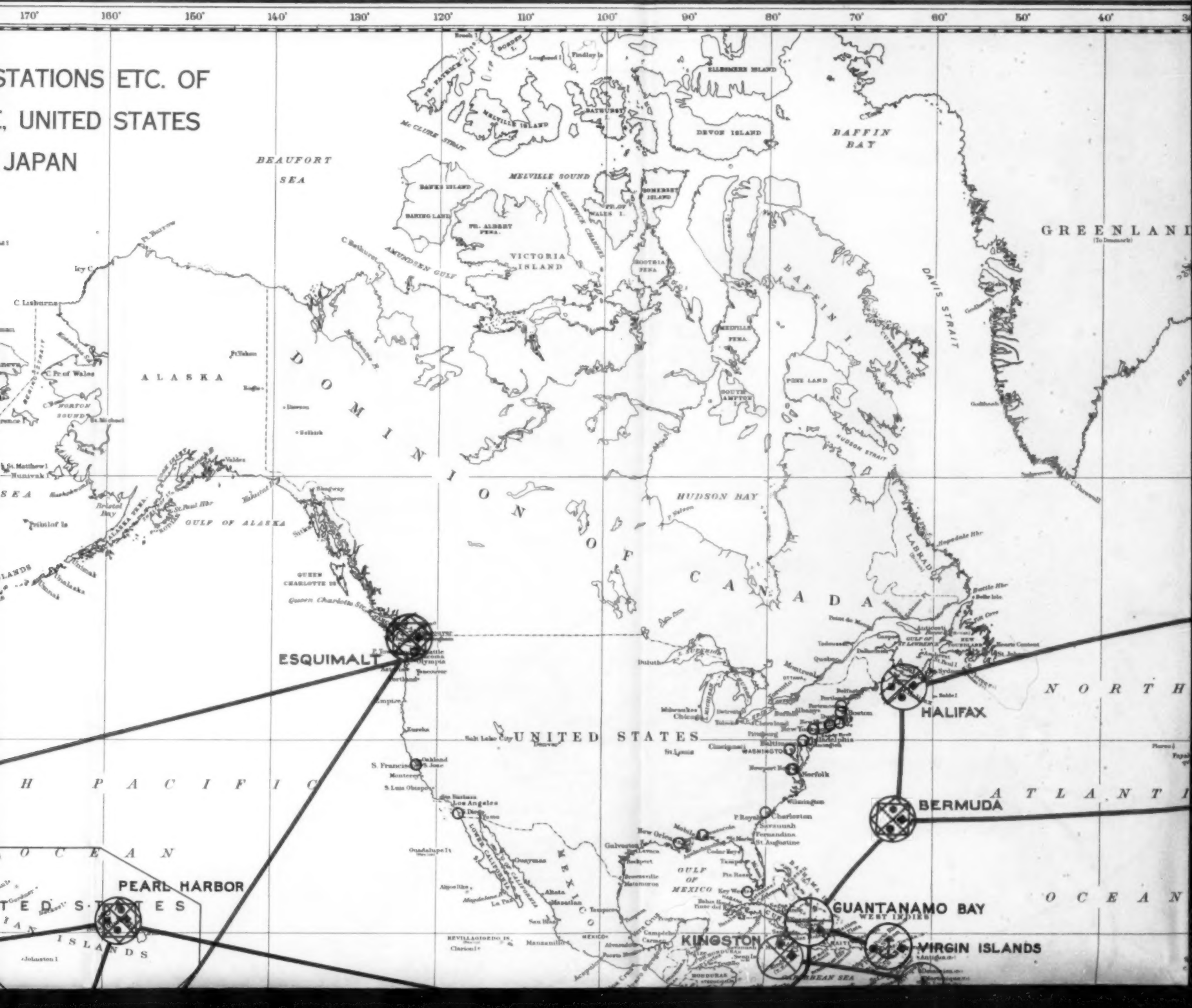


OUTLINE CHART OF THE WORLD



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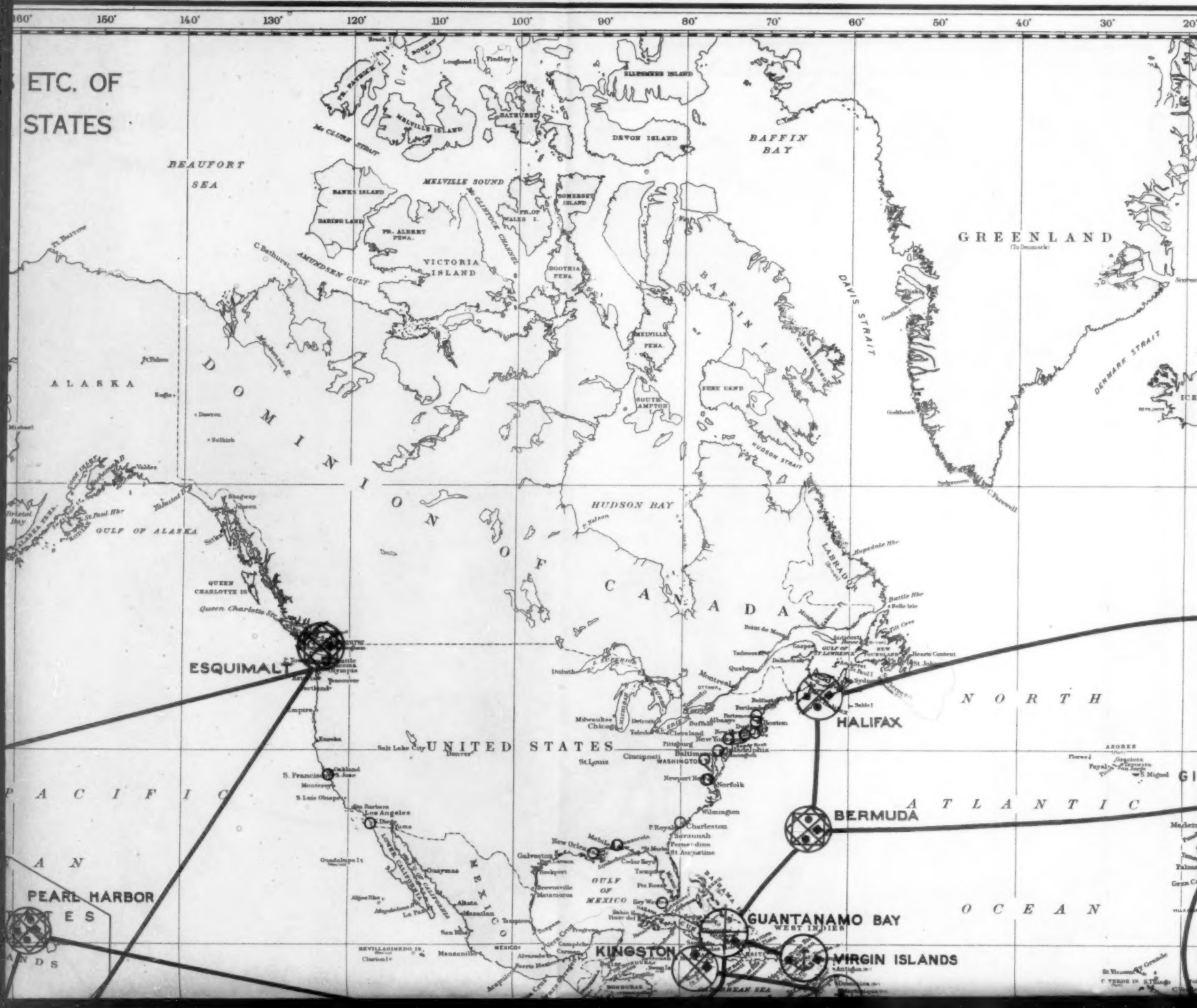

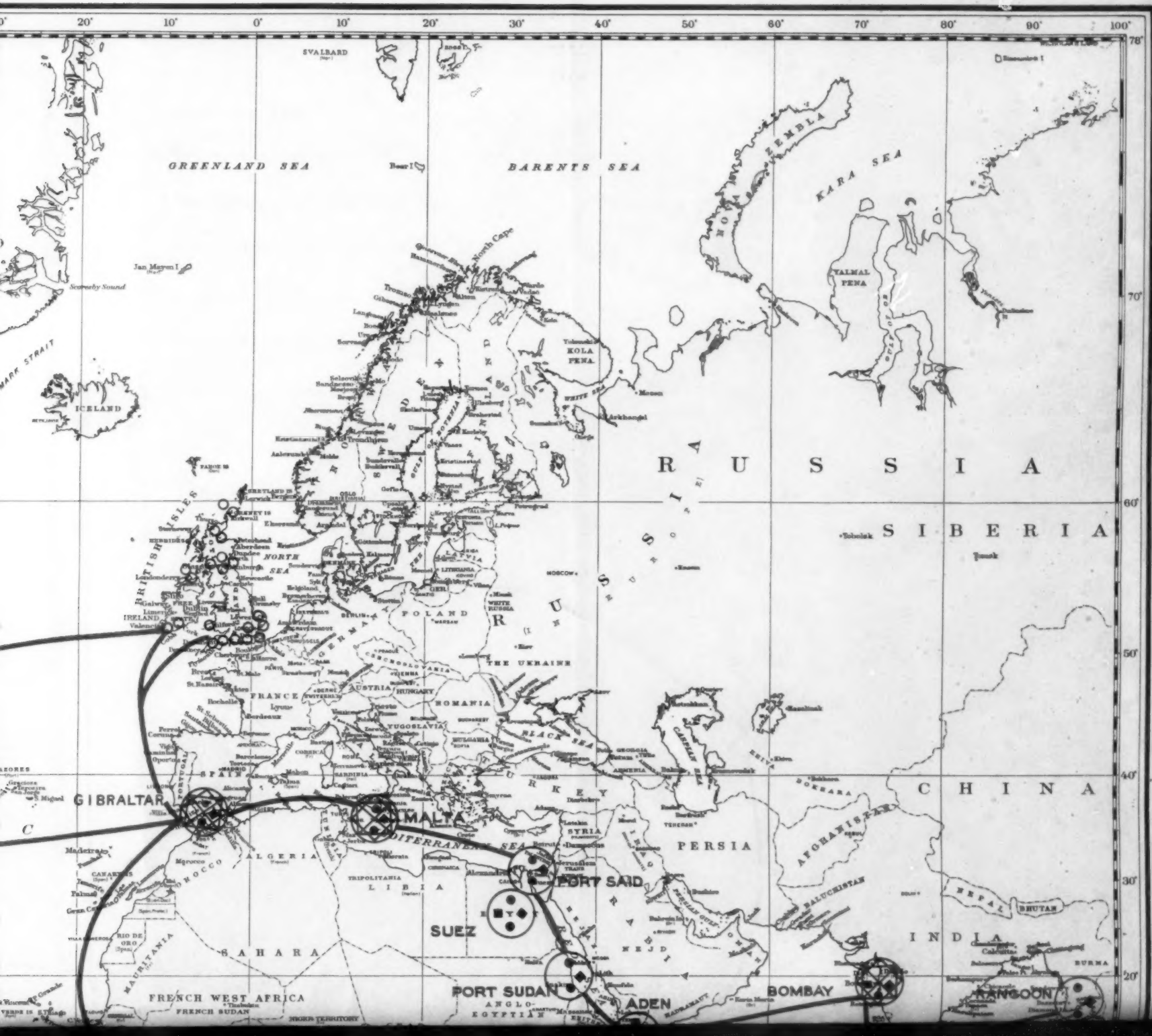
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KARA SEA
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ICELAND
DENMARK STRAIT
North Cape
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YALMAL PENA
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SIBERIA
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Korea
Fusan
Gensan
Chemulpo
Port Arthur
Dairen
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Sea of Japan
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Mongolia
Urga
Kiakhta
Lake Baikal
Transbaikalia
Chita
Nerchinsk
Blagovestchensk
Khabarovsk
Amur
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Macassar
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Singapore
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Mauritania
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French Sudan
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Nigeria
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Kumasi
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Canary Is.
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Azores
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Yemen
Sanaa
Hodeida
Mocha
Arabia
Nejd
Hejaz
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Medina
Jeddah
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Port Elizabeth
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Durban
Natal
Orange Free State
Bloemfontein
Transvaal
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Cape Province
Namaqualand
Kalahari Desert
Great Karroo
Little Karroo
Drakensberg Mts.
Table Mountain
Cape of Good Hope
Cape Agulhas
Cape Point
Simonstown
Walvis Bay
Swakopmund
Windhoek
German South West Africa
Lüderitz Bay
Orange River
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Matadi
Boma
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Sea of Okhotsk
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Sakhalin
Hokkaido
Honshu
Kyushu
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Mindanao
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Borneo
Celebes
Java
Sumatra
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Malacca
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Nicobar Is.
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Laccadive Is.
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Farquhar Is.
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Tulear
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Mauritius
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St. Denis
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Heard I.
Macquarie I.
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Campbell I.
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Bounty Is.
Chatham Is.
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Dunedin
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Wanganui
Napier
Gisborne
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Solomon Is.
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Rio Colorado
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South Georgia
South Sandwich Is.
Graham Land
Weddell Sea
Ross Sea
Ross Ice Barrier
Victoria Land
Mt. Erebus
Mt. Terror
Mt. Discovery
Mt. Markham
Mt. Sidley
Mt. Kirkpatrick
Mt. Nansen
Mt. Lister
Mt. Hope
Mt. Bird
Mt. Minto
Mt. Haddington
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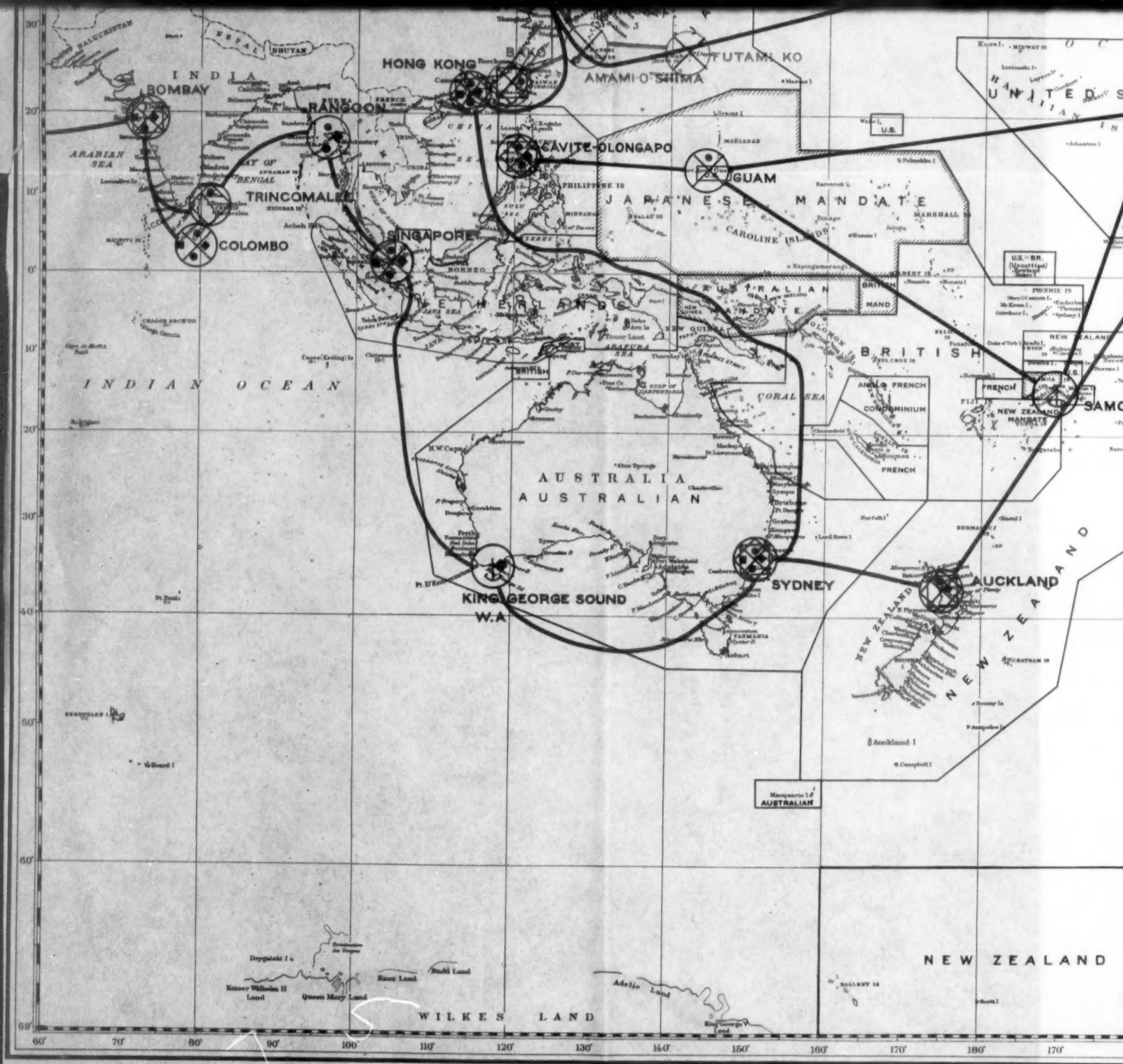
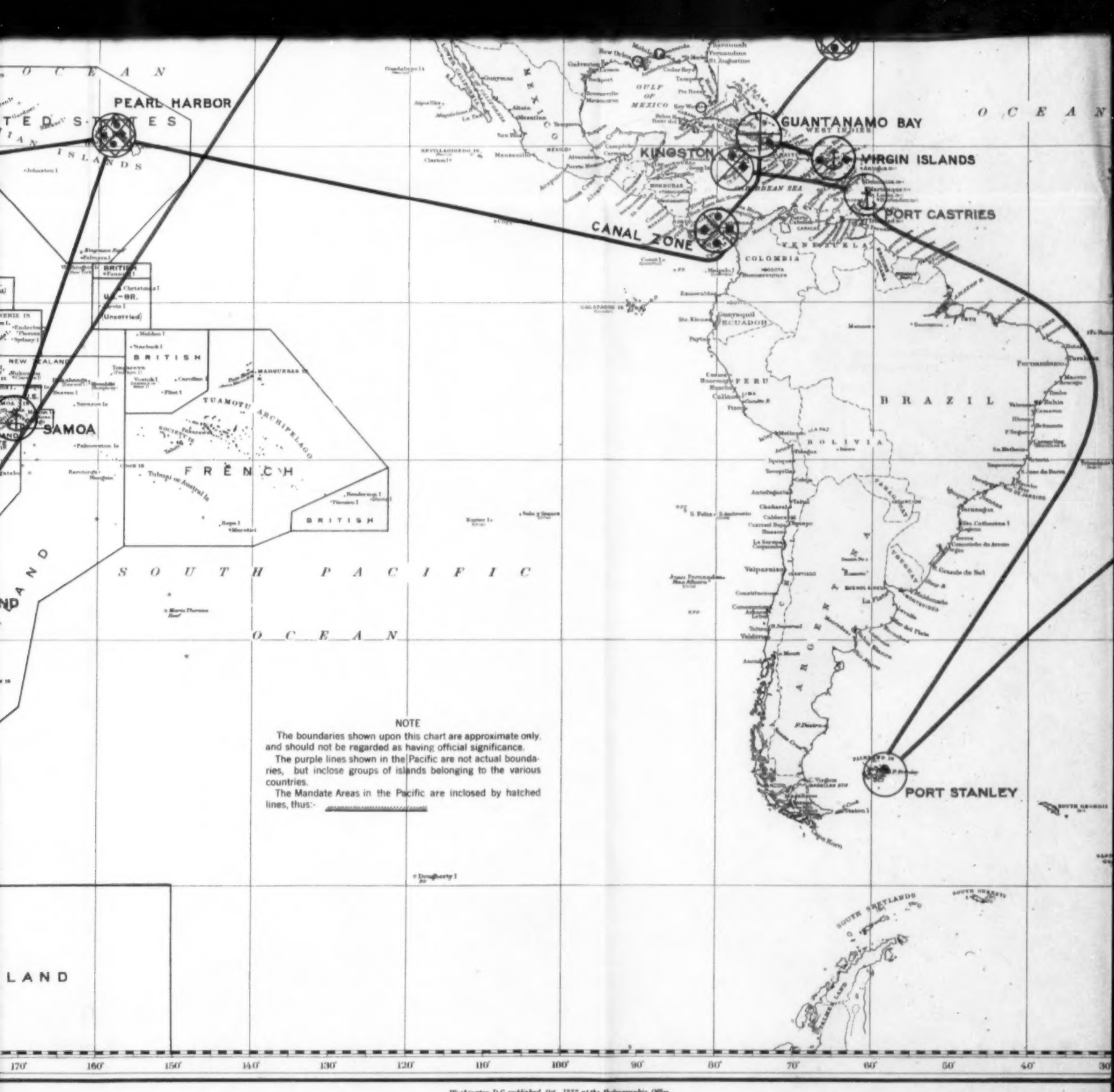


Small corrections from Notices to Mariners / from other sources

Printed	Mar '38	Sept. '39	Apr '40
	22 '38	28 '39	22 '40



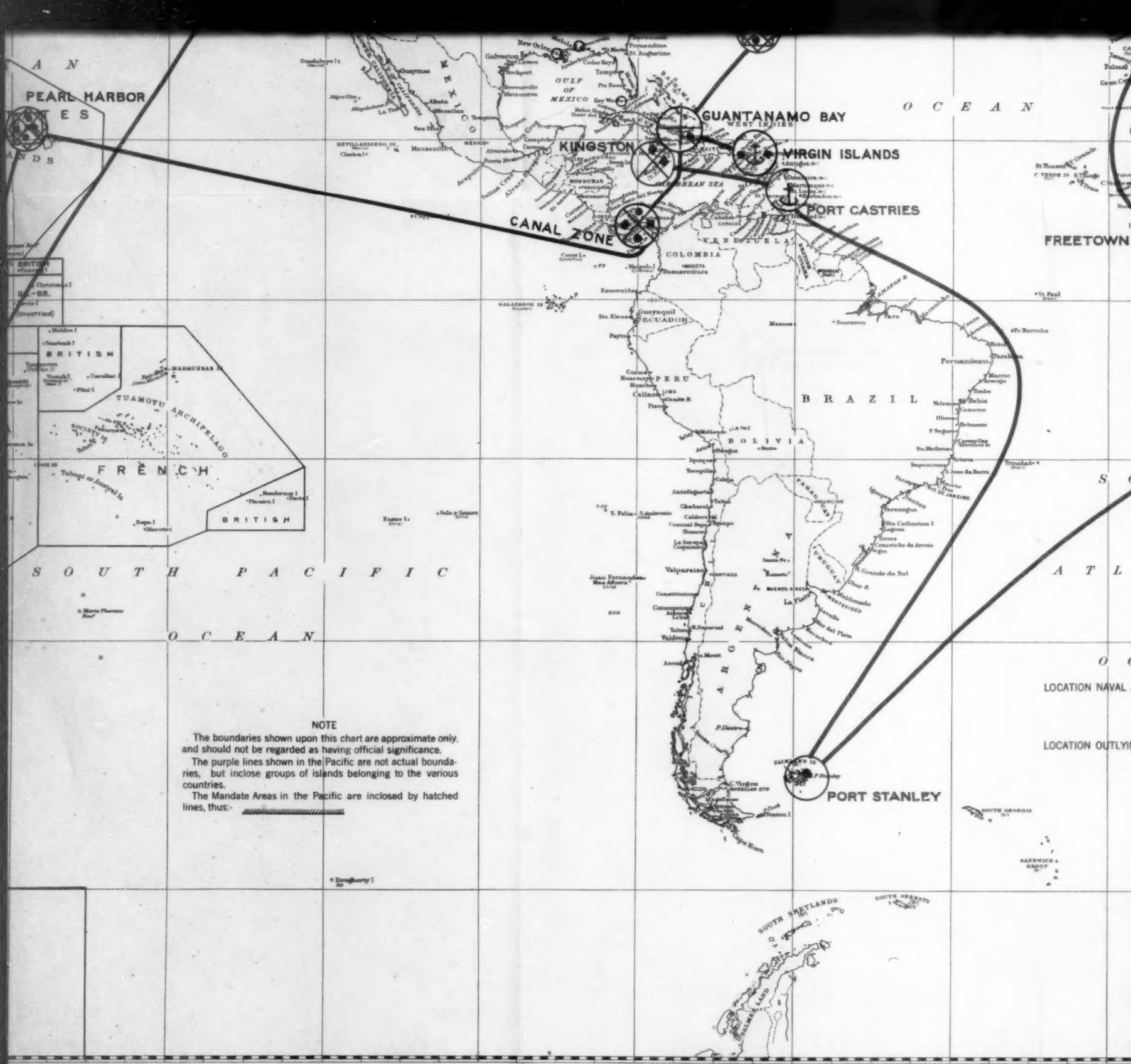
NOTE

The boundaries shown upon this chart are approximate only, and should not be regarded as having official significance.

The purple lines shown in the Pacific are not actual boundaries, but inclose groups of islands belonging to the various countries.

The Mandate Areas in the Pacific are inclosed by hatched lines, thus:-

Washington, D.C. published, Oct., 1922 at the Hydrographic Office under the authority of the SECRETARY OF THE NAVY



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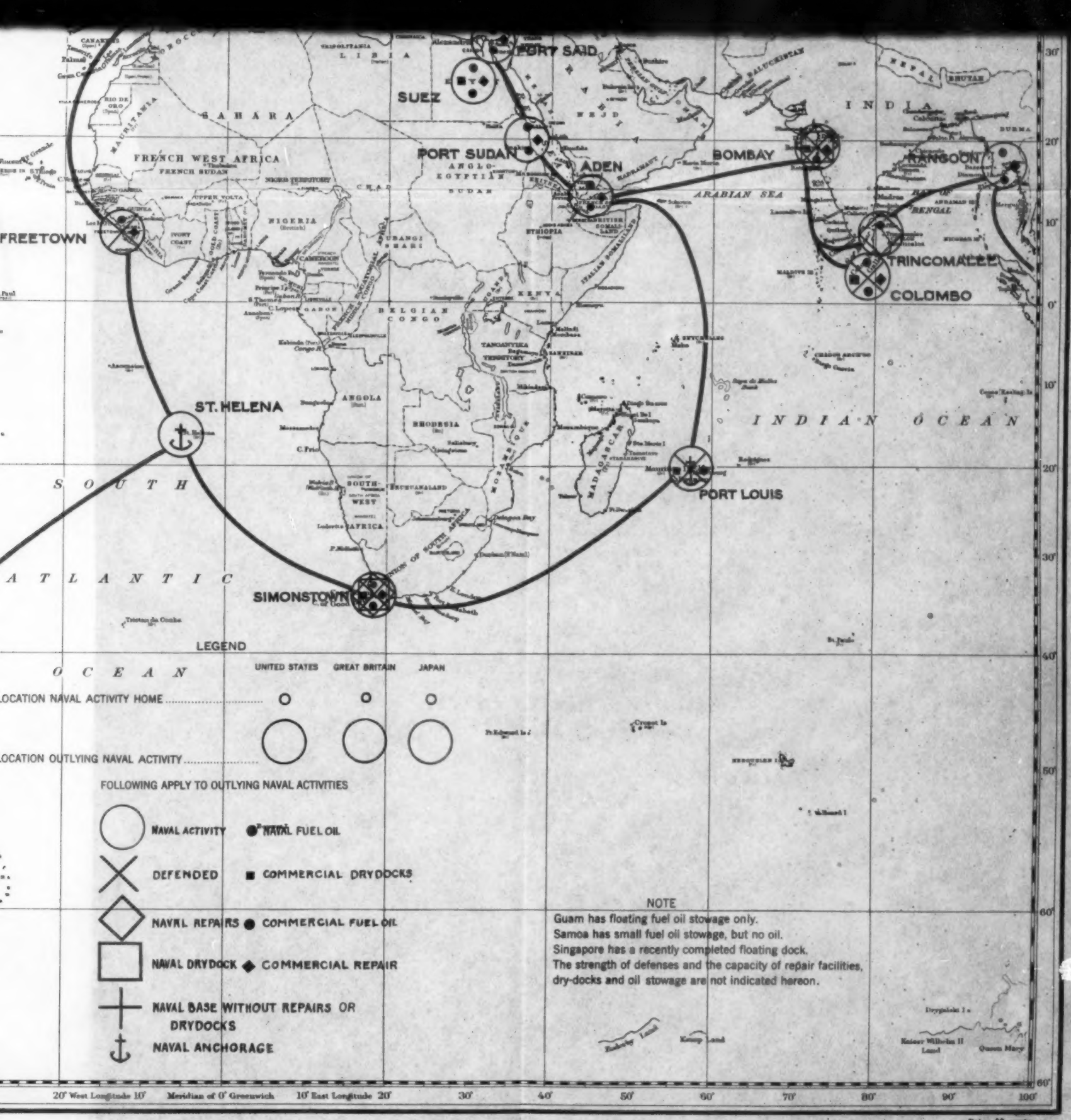

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Price 50 cents

No. 1262 a

American Flag Services *in* Foreign *and* Noncontiguous Trade

As of January 1, 1930

A—Lines Controlled by United States Shipping Board

NO.	COMPANY AND LINE	SERVICE	PORTS OF CALL	
			UNITED STATES	FOREIGN AND NONCONTIGUOUS
1	American Gulf Orient Line Tampa Inter-Ocean S. S. Co. Whitney Central Bldg. New Orleans, La.	Freight	Tampa or Boca Grande, Mobile New Orleans, Galveston, Houston, Corpus Christi, via Los Angeles	Honolulu, Yokohama, Kobe, Osaka, Shanghai, North China ports, Amoy, Swatow, Foochow, Hong Kong, Philippine Island ports
2	American Pioneer Line Roosevelt S.S. Co., Inc. 11 Broadway New York City	Freight & Ltd. Pass.	New York (returning via other North Atlantic ports, Gulf ports occasionally)	Via Suez Canal, Karachi, Bombay, Colombo, Madras, Calcutta and ore ports, Aden
			Baltimore, New York, Hampton Roads (Gulf ports occasionally)	Via Panama Canal, Honolulu, Manila, Hong Kong, Shanghai, North China and Japan ports, Philippine Island ports
			New York (returning via other North Atlantic ports)	Via Panama Canal, Wellington or Brisbane, Sydney, Melbourne, Adelaide, (Cairns, Bunbury, Hobart occasionally; to Fremantle once a month, usually returning via Singapore, India, and Suez Canal)
3	Oriole Lines Consolidated Navigation Co. First National Bank Bldg. Baltimore, Md.	Freight	Baltimore, Norfolk, Boston	Manchester, Liverpool
			Baltimore, Norfolk, New York	Manchester, Cork
			Baltimore, Norfolk, New York	Glasgow, Avonmouth (Cardiff occasionally)
			Baltimore, Norfolk, New York	Dublin, Belfast, Londonderry (ports are interchangeable)
4	American Hampton Roads Line Southgate-Nelson Corp. Southgate Terminal Foot of Tazewell Street Norfolk, Va.	Freight	Philadelphia, Baltimore, Norfolk, Boston, Portland	London, Hull or Leith, Dundee (Middlesbrough occasionally)
5	Yankee Line Rogers & Webb 110 State Street Boston, Mass.	Freight	Philadelphia, Boston, Portland	Hamburg, Bremen
			Baltimore, Norfolk, Boston	Hamburg, Bremen
6	American Diamond Lines Black Diamond S.S. Corp. 39 Broadway New York City	Freight & Ltd. Pass.	New York	Rotterdam
			New York, Boston	Rotterdam
			Boston, Philadelphia, Baltimore, Hampton Roads	Rotterdam
			New York, Philadelphia, Chester	Antwerp
			New York, Hampton Roads, Baltimore	Antwerp
7	America France Line Cosmopolitan Shpg. Co., Inc. 42 Broadway New York City	Freight	New York, Philadelphia, and / or Baltimore, and / or Boston	Havre, Dunkirk
			New York, Philadelphia, Baltimore	Bordeaux, Saint Nazaire
8	Southern States Line Lykes Bros. Ripley S.S. Co., Inc. 925 Whitney Central Bldg. New Orleans, La.	Freight	New Orleans, Tampa occasionally	Bremen, Hamburg, Rotterdam
			New Orleans, Tampa, Galveston, Houston	Bremen, Hamburg, Memel occasionally
			Lake Charles, Port Arthur, Beaumont, Orange, Galveston, and / or Houston	Bremen, Hamburg, Rotterdam, Antwerp
			Houston, Texas City, Galveston	Bremen, Rotterdam
			Galveston, Houston, Corpus Christi occasionally	Bremen, Hamburg and / or Rotterdam, and / or Antwerp
9	Mobile Oceanic Line Waterman S.S. Corp. First National Bank Bldg. Mobile, Ala.	Freight	Pensacola, Gulfport, Mobile	Liverpool, Manchester (outports of United Kingdom when cargo offers)
			Pensacola, Gulfport, Mobile	London, Rotterdam, Antwerp
			Mobile, Pensacola, and / or Gulfport	Bremen, Hamburg
			Mobile, Pensacola, Tampa, New Orleans occasionally	Bremen, Rotterdam, and / or Hamburg
10	Texas Star Line Lykes Bros. Ripley S.S. Co., Inc. 925 Whitney Central Bldg. New Orleans, La.	Freight	Galveston, Corpus Christi, and / or Houston, and / or Orange, and / or Port Arthur, and / or New Orleans, and / or Tampa	Havre, Rotterdam, Dunkirk occasionally
			Galveston, Houston, and / or Corpus Christi, and / or Lake Charles, and / or Orange, and / or Texas City, and / or Freeport	Havre, Rotterdam, and / or Antwerp
11	Mississippi Valley European Line Mississippi Shpg. Co., Inc. 1310–1316 Hibernia Bank Bldg. New Orleans, La.	Freight & Ltd. Pass.	New Orleans, Tampa and Jacksonville occasionally	Havre, Antwerp, Ghent

A—Lines Controlled by United States Shipping Board *(Continued)*

NO.	COMPANY AND LINE	SERVICE	PORTS OF CALL	
			UNITED STATES	FOREIGN AND NONCONTIGUOUS
12	Texas Ukay Line Texas Oceanic S.S. Co., Inc. Cotton Exchange Bldg. Galveston, Texas	Freight	Galveston, Houston, and / or Texas City, and / or Corpus Christi Galveston, Houston, Port Arthur district, Lake Charles Galveston, Houston, Port Arthur district, Lake Charles	Liverpool, Manchester, Cardiff or Runcorn occasionally Liverpool, Manchester, and/ or Glasgow, Avonmouth, and other United Kingdom ports London, Plymouth and / or Leith and Aberdeen, and / or Hull and Havre
13	Dixie U. K. Line Dixie S.S. Co., Inc. Whitney Central Bldg. New Orleans, La.	Freight	New Orleans, Savannah, Wilmington occasionally New Orleans New Orleans New Orleans (occasionally Tampa)	Glasgow, Dublin, and / or Belfast, and / or Cork, and / or Limerick, Avonmouth London Liverpool, Manchester London, Leith, or Hull, or Newcastle, or Sunderland
14	Texas Mediterranean Line Texas Oceanic S.S. Co., Inc. Cotton Exchange Bldg. Galveston, Texas	Freight	Galveston, Freeport, Houston, Lake Charles, Beaumont district, Corpus Christi, Savannah, Wilmington	Marseille, Cette, Genoa, Naples, Cagliari, Leghorn, Algiers, Arzeu
15	Dixie Mediterranean Line Dixie S.S. Co., Inc. Whitney Central Bldg. New Orleans, La.	Freight	New Orleans, Mobile, Pensacola, Galveston, Houston, Corpus Christi, Savannah, Wilmington	Marseille, Genoa, Leghorn, Naples, Adriatic Sea ports, Piraeus, Alexandria, Port Said
16	Gulf West Mediterranean Line Tampa Inter-Ocean S.S. Co. Whitney Central Bldg. New Orleans, La.	Freight	New Orleans, Houston, Galveston, Tampa, Mobile, Pensacola, Gulfport, and South Atlantic ports	Pasages, Santander, Bilbao, Musel Vigo, Oporto, Lisbon, Seville, Cadiz, Algeciras, Valencia, Palamos, Barcelona, Tarragona, San Feliu de Guixols, Alicante, Cartagena, Malaga, and North African ports
17	American Republics Line C. H. Sprague & Co. 44 Whitehall St. New York City	Freight	New York, Boston, Philadelphia New York, Philadelphia, Baltimore Hampton Roads, Savannah or Jacksonville, or Brunswick	Montevideo, Buenos Aires and River Plate ports Victoria, Rio de Janeiro, Santos, Rio Grande do Sul, and River Plate ports
18	American Brazil Line Colombian S.S. Co., Inc. 17 Battery Place New York City	Freight & Ltd. Pass.	New York New York, Philadelphia, Savannah, and / or Jacksonville	Pernambuco, Bahia Para, Maranhao, Parnahyba, Ceara Natal, Cabadello, Pernambuco, Maceio, Bahia and Victoria
19	Pacific South African Line South African Dispatch Line 233 Pine St. San Francisco, Calif.	Freight & Ltd. Pass.	San Francisco, Los Angeles, Portland, Puget Sound	Cape Town, East London, Algoa Bay, Port Natal, Lourenco Marques, Beira, Vancouver, B.C.

B—Routes Disposed of by United States Shipping Board

NO.	COMPANY AND LINE	SERVICE	PORTS OF CALL	
			UNITED STATES	FOREIGN AND NONCONTIGUOUS
20	American South African Line American South African Line, Inc. 39 Cortlandt St. New York City	Freight Pass.	New York, Baltimore, Philadelphia, Boston	Cape Town, Algoa Bay, East London, Port Natal, Mossel Bay, Lourenco Marques, Beira, other East African ports, Madagascar, Reunion Island, Port Louis
21	American West African Line Barber S.S. Co. 17 Battery Place New York City	Freight Pass.	New York, Philadelphia and Boston occasionally (Gulf service—Port Arthur, New Orleans, Pensacola)	Canary Islands and West African ports, from Dakar to Belgian Congo and Portuguese Angola, Azores, Madeira and Saint Vincent. (Three services: Burutu, Port Harcourt, and Congo-Angola Express Service from New York)
22	United States Lines United States Lines Operations, Inc 45 Broadway New York City	Freight Pass.	New York	Cobh, Plymouth, Southampton, Cherbourg, Hamburg
23	American Merchant Line United States Lines Operations, Inc 45 Broadway New York City	Freight Pass.	New York	Plymouth, London
24	American Palmetto Line (now South Atlantic Mail Line) South Atlantic S.S. Co. 3436 East Bay St. Savannah, Ga.	Freight	Jacksonville, Fernandina, Brunswick, Wilmington, Savannah, Charleston	Liverpool, Manchester, Antwerp Rotterdam, Bremen, Hamburg
25	American Scantic Line Moore & McCormack Co., Inc. 5 Broadway New York City	Freight Pass.	New York, Boston, Philadelphia, Hampton Roads, Baltimore, (Portland inbound)	Copenhagen, Stockholm, Helsingfors, Gdynia, Danzig, Leningrad, and all other ports in Scandinavia and on the Baltic Sea. Also, Murmansk and Archangel on the White Sea

B—Routes Disposed of by United States Shipping Board *(Continued)*

NO.	COMPANY AND LINE	SERVICE	PORTS OF CALL	
			UNITED STATES	FOREIGN AND NONCONTIGUOUS
26	American Export Line Export S.S. Co. 25 Broadway New York City	Freight & Ltd. Pass.	New York	Piraeus, Salonica, Istanbul, Constantsa
			Philadelphia, New York	Malta occasionally, Alexandria, Joppa, Haifa, Beirut (cargo for Egypt, Palestine and Syria)
			Baltimore, Philadelphia, New York	Genoa, Leghorn, Naples, and other Mediterranean ports
			Philadelphia, New York	Casablanca, Tangier, Ceuta, Melilla, Oran, Tunis
			Baltimore, New York, Norfolk	Odessa, Novorossiisk, Batum returning via Mediterranean ports
27	American Antilles Line (now Ocean Dominion S.S. Corp.) 17 Battery Place New York City	Freight	New York, Hampton Roads	Saint Thomas, Saint Croix, Saint Kitts, Antigua, Guadeloupe, Dominica, Martinique, Barbados, Trinidad, Grenada, Saint Vincent, Saint Lucia, Georgetown, Paramaribo, Cayenne
28	Pan America Line (now Munson Line) 67 Wall St. New York City	Freight Pass.	New York	Buenos Aires, Montevideo Santos, Rio de Janeiro
29	Pacific Argentine Brazil Line McCormick S.S. Co. 215 Market St. San Francisco, Calif.	Freight & Ltd. Pass.	Puget Sound, Grays Harbor, Columbia River, San Francisco, Los Angeles	Vancouver, B. C., Bahia Blanca, Buenos Aires, Montevideo, Santa Fe, Rosario, Santos, Rio de Janeiro, Para, San Juan and Porto Rican outports, Puerto Colombia
30	North Pacific Line (now Grace Line) (North Pacific Division) 322 Pine St. San Francisco, Calif.	Freight & Ltd. Pass.	Puget Sound, Columbia River, San Francisco, Los Angeles	British Columbia ports, Talara, Payta, Pimentel, Pacasmayo, Salaverry, Chimbote, Supe, Huacho, Callao, Cerro Azul, Tambo de Mora, Pisco, Moilendo, Arica, Iquique, Tocopilla, Mejillones, Antofagasta, Chanaral, Caldera, Coquimbo, Valparaiso, San Antonio
31	Oregon Oriental Line (now States S.S. Line) States S.S. Co. Porter Bldg. Portland, Oregon	Freight	San Francisco and Columbia River	Shanghai, Tsingtao, Taku, Dairen, Otaru, and North China ports
			Columbia River, San Francisco	Yokohama, Osaka, Kobe, Hong Kong, Philippine Island ports, and South China ports
32	American Oriental Mail Line (now Tacoma Oriental S.S. Co.) 915 Washington Bldg. Tacoma, Wash.	Freight	Puget Sound, occasionally from Grays Harbor, returning via San Francisco	British Columbia ports, Yokohama, Kobe, Osaka, Amoy, Hong Kong, Philippine Island ports
				Yokohama, Kobe, Osaka, Shanghai, Tsingtao, Dairen, Taku, other North China ports, Otaru
33	American Australia Orient Line (now Oceanic & Oriental Nav. Co.) 215 Market St. San Francisco, Calif. Australian & New Zealand Service Matson Navigation Co. Oriental Service American-Hawaiian S.S. Co.	Freight	Puget Sound, Grays Harbor, Columbia River, Eureka, San Francisco, Los Angeles	Vancouver, B. C., Melbourne, Sydney, Newcastle, Brisbane, Hobart, Port Moresby, Launceston, Napier, Wellington, New Plymouth, Auckland, Dunedin, Nelson, Lyttleton, Christchurch, Timaru, Bluff Harbor, Geelong, Levuka, Honolulu
			Los Angeles, San Francisco	Yokohama, Nagoya, Kobe, Osaka, Moji, Nagasaki, Shanghai, Tsingtao, Chefoo, Wei-hai-wei, Taku, Dairen, Chinnampo, Chemulpo, Fusan, Amoy, Foochow, Hong Kong, Haiphong, Tourane, Saigon, Bangkok, Philippine Island ports
34	Dollar-Around-the-World Line Robert Dollar Bldg. San Francisco, Calif.	Freight Pass.	Boston, New York via Panama Canal, Los Angeles, San Francisco	Havana, Honolulu, Kobe, Shanghai, Hong Kong, Manila, Singapore, Penang, Colombo, Suez, Port Said, Alexandria, Naples, Genoa, Marseille
35	American Oriental Mail Line (Pass.)	Freight Pass.	Seattle, Tacoma, San Francisco, Los Angeles	Victoria, B. C., Yokohama, Kobe, Shanghai, Hong Kong, Manila, Honolulu
36	California Orient Line (now American Mail Line) 1519 Railroad Ave., South Seattle, Wash.			
37	Lasco Line Los Angeles S.S. Co. 730 South Broadway Los Angeles, Calif.	Freight Pass.	Los Angeles, Honolulu, Hilo, Kahulaui	
38	Gulf Brazil River Plate Line Mississippi Shpg. Co., Inc. 1310–1316 Hibernia Bank Bldg. New Orleans, La.	Freight & Ltd. Pass.	New Orleans, Mobile, Port Arthur, Galveston	Trinidad, Pernambuco, Para, Ceara, Cabadello, Natal, Maceio, Bahia, Santos, Rio Grande do Sul, Rio de Janeiro, Victoria, Montevideo, Buenos Aires, La Plata, Rosario, Bahia Blanca

C—Other Lines Operating One or More Vessels Acquired from United States Shipping Board

NO.	COMPANY AND LINE	SERVICE	PORTS OF CALL	
			UNITED STATES	FOREIGN AND NONCONTIGUOUS
39	A. H. Bull and Co. Baltimore Insular Line Pier No. 5—Pratt St. Baltimore, Md.	Freight	Baltimore, Philadelphia, Norfolk	All Porto Rican ports
	Bull Insular Line		New York	All Porto Rican ports
			New York	All Dominican Republic ports
40	American Sugar Transit Corp. 117 Wall St. New York City	Freight	Boston, New York, Philadelphia New Orleans	Port Tarafa and other Cuban ports
41	Atlantic Fruit and Sugar Co. Atlantic Navigation Corp. 117 Battery Place New York City	Freight	New York	Nuevitas, Pastellilo, Port Tarafa, Manati
			New York	Antilla, Banes, Gibara
			New York	Santiago, Guantanamo, Manzanillo Baracoa and other Cuban ports
			New York	Santiago, Cienfuegos
			New York or Philadelphia, or Baltimore	Port Antonio
	Banana Sales Corp. Pier No. 30—S. Wharf St. Philadelphia, Pa. 125 South St. Baltimore, Md.	Freight	Philadelphia, Baltimore	Sama, Baracoa
42	Red "D" Line The Atlantic & Caribbean Steam Nav. Co. 82 Wall St. New York City	Freight & Ltd. Pass.	New York	San Juan, La Guaira, Puerto Cabello Maracaibo, Curacao
43	Munson Line 67 Wall St. New York Cty	Freight Pass.	Baltimore, Norfolk, Jacksonville, Miami	Havana
			New York, Miami	Havana, Nassau
			New Orleans	Campeche, Puerto Mexico, Progreso
			New Orleans, Mobile	Havana, Palo Alto, Cienfuegos, Sagua la Grande, Caibarien, Guantanamo, Santiago, Manzanillo, Puerto Padre, Canbanas, Nuevitas
			New York or Philadelphia, or Boston, or Norfolk, or Charleston, or Savannah, or Wilmington	Matanzas, Caibarien, Cardenas, Sagua la Grande, Nuevitas, Pastellilo, Port Tarafa, Puerto Padre, Antilla, Cienfuegos, Manzanillo, Banes, Havana
			New Orleans, Mobile, Pensacola and Port Arthur occasionally	River Plate
			Baltimore, Norfolk	Puerto Cabello, Maracaibo
44	Munson-McCormick Lines McCormick S.S. Co. 215 Market St. San Francisco, Calif.	Freight	West Coast ports to North Atlantic ports	San Juan, Ponce
45	Commercial S.S. Lines (now Mooremack Lines) Moore & McCormack S.S. Co. 5 Broadway, New York City	Freight	New York, Philadelphia, Baltimore, Norfolk, Boston, Portland	Rio de Janeiro, Santos, Montevideo, Rosario, Buenos Aires
			New York, Philadelphia, Baltimore, Norfolk, Boston, Portland	Buenaventura, Guayaquil, Callao and other ports in Peru and Chile
			New York, Philadelphia, Baltimore	Cuban ports, Venezuelan ports
46	Panama R. R. Line Panama R. R. Co. 24 State St. New York City	Freight Pass.	New York	Port au Prince, Colon, Cristobal
			New York	Port au Prince, Cristobal, Buenaventura, Tumaco, Esmeraldas, Bahia de Caraques, Manta, Guayaquil, Puerto Bolivar
47	Nosa Line New Orleans and South American S.S. Co., Inc. Queen and Crescent Bldg. New Orleans, La.	Freight	New Orleans	Cristobal, Panama, Buenaventura, Guayaquil, Talara, Payta, Pimentel, Pacasmayo, Salaverry, Callao, Cerro Azul, Pisco, Mollendo, Arica, Iquique, Tocopilla, Antofagasta, Caleta Colosa, Chanaral, Coquimbo, Valparaiso, San Antonio, Talcahuano, Corral
48	Colombian Line Colombian S.S. Co. 17 Battery Place New York City	Freight	New York, Philadelphia	Cape Haitien, Port de Paix, Gonaives, Saint Marc, Port au Prince, Petit Goave, Miragoane, Jeremie, Aux Cayes, Kingston, Port Antonio, Cartagena, Puerto Colombia
49	Gulf Pacific Line Gulf Pacific Line, Inc. 240 Front St. San Francisco, Calif.	Freight	Gulf and Pacific Coast ports	Vancouver, Cartagena, Puerto Colombia, Curacao, Kingston, Port au Prince, Havana, Manzanillo, Vera Cruz, Tampico, Puerto Mexico

C—Other Lines Operating One or More Vessels Acquired From United States Shipping Board *(Continued)*

NO.	COMPANY AND LINE	SERVICE	PORTS OF CALL	
			UNITED STATES	FOREIGN AND NONCONTIGUOUS
50	Lykes Bros. S.S. Co. 907 U. S. National Bank Bldg. Galveston, Texas	Freight & Ltd. Pass.	Beaumont, Port Arthur, Orange, Lake Charles, Houston, Galveston	Porto Rican, Dominican Republic and Haitien ports
51	Flood Line Carriso, Inc. 444 Market St. San Francisco, Calif.	Freight	San Francisco, Los Angeles	Pago Pago, Noumea, Melbourne, Sydney, Brisbane, Rockhampton, Cairns, Port Moresby, Samaral, Rabaul, Makambo Island, Gizo Island, Nauru Island, Tarawa Island
52	Matson Navigation Co. 215 Market St. San Francisco, Calif.	Freight Pass.	San Francisco, Portland, Seattle Los Angeles, San Francisco, Hawaii	Manila and other Philippine Island ports
53	Alaska S.S. Co. Pier No. 2, Seattle, Wash.	Freight Pass.	Puget Sound	Alaskan ports
54	Dollar Line Dollar S.S. Lines, Inc. Robert Dollar Bldg. San Francisco, Calif.	Freight	Los Angeles, San Francisco, Honolulu	Manila, Singapore
	and American Mail Line 1519 Railroad Ave., South Seattle, Wash.	Freight	Puget Sound	Shanghai, Amoy, Hong Kong, Philippine Island ports, Osaka, Yokohama, Guam as cargo offers
55	Admiral Line Pacific S.S. Co. 1519 Railroad Ave., South Seattle, Wash.	Freight Pass.	San Diego, Los Angeles, San Francisco, Astoria, Portland, Puget Sound ports	Vancouver, Victoria
			Puget Sound ports	Southeastern and Southwestern Alaska
56	Gulf Mail Line Gulf Mail S.S. Co., Inc. 1803 Pere Marquette Bldg. New Orleans, La.	Freight Pass.	New Orleans	Progreso, Mexico
57	Gulf Caribbean S.S. Line Gulf Caribbean S.S. Line, Inc. Petroleum Bldg. Houston, Texas	Freight	Houston, New Orleans	Cristobal, Cartagena, Puerto Colombia, Curacao, La Guaira, Puerto Cabello, Maracaibo
58	Strachan S.S. Co. Strachan's Southern S.S. Co. Savannah, Ga.	Freight	Tampa, Jacksonville, Fernandina, Brunswick, Savannah, Charleston, Wilmington, N. C.	London, Rotterdam, Antwerp, Hamburg
6	Porto Rico Line New York & Porto Rico S.S. Co. 25 Broadway New York City	Freight Pass.	New York	San Juan, Porto Rican outports, Santo Domingo
			Mobile, New Orleans	Porto Rican ports

D—Lines Operating no Vessels Purchased from United States Shipping Board

NO.	COMPANY AND LINE	SERVICE	PORTS OF CALL	
			UNITED STATES	FOREIGN AND NONCONTIGUOUS
59	American & Cuban S.S Line American & Cuban S.S. Line Inc. 39 Cortlandt St. New York City	Freight	New York, Philadelphia, Norfolk, San Francisco, and other ports as cargo offers	Havana, Matanzas, Cardenas, Sagua la Grande, Caibarien, Hawaii, and other sugar ports
60	Atlantic Transport Co. International Mercantile Marine Co. 1 Broadway New York City	Freight Pass.	New York	London, Boulogne, Plymouth
	Panama Pacific Line International Mercantile Marine Co. 1 Broadway New York City	Freight Pass.	New York to Los Angeles, San Francisco	Havana, Canal Zone
62	Chile S.S. Co. 25 Broadway New York City	Freight	New York, Baltimore, Hampton Roads, Savannah and/or Wilmington	Arica, Iquique, Caleta Calosa, Antofagasta, Chanaral, Tocopilla
63	Eastern S.S. Lines India Wharf Boston, Mass.	Freight Pass.	Boston, Eastport	Saint John, N. B.
64	Nova Scotia S.S. Corp. India Wharf Boston, Mass.	Freight Pass.	Boston, New York	Yarmouth

D—Lines Operating No Vessels Purchased From United States Shipping Board
(Continued)

NO.	COMPANY AND LINE	SERVICE	PORTS OF CALL	
			UNITED STATES	FOREIGN AND NONCONTIGUOUS
65	Ore S.S. Corp. 25 Broadway New York City	Freight	New York, Baltimore	Cruz Grande, Cristobal
66	See Table C			
67	Ward Line New York & Cuba Mail S.S. Co. Foot of Wall St. New York City	Freight Pass.	New York New York New York New York	Havana Havana, Progresso, Vera Cruz Tampico Guantanamo, Santiago, Manzanillo Cienfuegos
68	Santo Domingo Line New York & Porto Rico S.S. Co. 25 Broadway New York City	Freight Pass.	New York	Santo Domingo ports and Turks Island
69	Clyde Line Clyde S.S. Co. Pier 36, North River New York City	Freight	Miami	Havana
70	P. & O. S. S. Co. Jacksonville, Fla.	Pass. (car ferry)	Key West, Tampa	Havana
71	Florida R. R. Nav. Corp. (The Collier Line) Box No. 772 Tampa, Fla.	Freight Pass.	Miami	Nassau
72	United Fruit S. S. Co. 1 Federal St. Boston, Mass. 17 Battery Place New York City 321 St. Charles St. New Orleans, La. 433 California St. San Francisco, C alif.	Freight Pass.	New York New York New York New York New York Baltimore Philadelphia Boston Charleston Mobile Mobile Mobile Mobile New Orleans New Orleans New Orleans New Orleans New Orleans San Francisco	Havana, Port Antonio, Kingston, Cristobal, Limon Kingston, Cristobal, Cartagena, Puerto Colombia, Santa Marta Santiago, Kingston, Puerto Castilla, Tela, Puerto Barrios, Belize Banes, Preston, Cienfuegos occasionally Kingston, Jamaican outports Kingston Kingston Tela, Havana Tela, Puerto Castilla Bocas del Toro Belize, Stann Creek Puerto Castilla, Tela Puerto Barrios, Livingston Cristobal, Puerto Colombia, Limon, Bocas del Toro Belize, Puerto Barrios, Tela Havana, Cristobal. Puerto Barrios Havana, Puerto Castilla Santiago, Kingston and Jamaican outports, Tela, Puerto Castilla, Belize, Stann Creek, Livingston, Puerto Barrios, Cartagena, Santa Marta La Union, Corinto, Puerto Armuelles, Balboa, Cristobal, San Jose, Acajutla, La Libertad, Champerico
73	Isthmian Line Isthmian S.S. Lines 50 Trinity Place New York City	Freight	Philadelphia, Boston, New York Philadelphia, Boston, New York Puget Sound, Portland, San Francisco, Los Angeles, San Diego East Coast ports	Port Said, Port Sudan, Hodeida, Aden Karachi, Bombay, Cochin, Colombo, Madras, Calcutta Honolulu, Manila, Pulupandan, Iloilo, Cebu, Balik Papan, Surabaya, Samarang, Batavia, Cheribon, Singapore, Malacca, Port Swettenham, Belawan, Aden Vancouver, B. C., London, Liverpool, Avonmouth, Belfast, Glasgow, Dublin, returning via Atlantic coast (Triangle Service) Vancouver, and Intercoastal
74	Panama Far East Line Isthmian Steamship Lines 50 Trinity Place or Norton, Lilly & Co. 26 Beaver St. New York City	Freight	Baltimore, New York, Honolulu, Hampton Roads and via Los Angeles occasionally Mobile, New Orleans, Houston, Honolulu, Galveston via Los Angeles occasionally	Yokohama, Kobe, Moji, Osaka, Shanghai, Hong Kong Yokohama, Kobe, Moji, Osaka, Shanghai, Hong Kong

D—Lines Operating No Vessels Purchased From United States Shipping Board
(Continued)

NO.	COMPANY AND LINE	SERVICE	PORTS OF CALL	
			UNITED STATES	FOREIGN AND NONCONTIGUOUS
75	Norton Line Isthmian Steamship Lines 50 Trinity Place or Norton, Lilly & Co. 26 Beaver St. New York City	Freight	New York (Philadelphia and Baltimore as cargo offers)	Montevideo, Buenos Aires, Rosario Santa Fe, Bahia Blanca
76	U. S. & Brazil Line Isthmian Steamship Lines 50 Trinity Place or Norton, Lilly & Co. 26 Beaver St. New York City	Freight	Baltimore, New York, Philadelphia occasionally	Trinidad, Pernambuco, Bahia, Rio de Janeiro, Santos, Rio Grande do Sul
77	N. Y. S. A. Line Isthmian Steamship Lines 50 Trinity Place New York City	Freight	Philadelphia, New York	Zorritos, Talara, Callao, Pisagua, Iquique, Caleta Buena, Tocopilla, Mejillones, Caleta Colosa, Antofagasta, Taltal, Valparaiso, San Antonio, Talcahuano
78	Border Line Transportation Co. 1162 Stuart Bldg. Seattle, Wash.	Freight	Puget Sound	British Columbia ports
79	Puget Sound Navigation Co. 33 Colman Dock Seattle, Wash.	Freight Pass. (auto ferry)	Puget Sound	Sidney, Victoria
80	Oceanic S.S. Co. Matson Navigation Co. 215 Market St. San Francisco, Calif.	Freight Pass.	San Francisco, Honolulu	Pago Pago, Suva, Sydney
81	Grace Line Grace S.S. Co. 10 Hanover Square New York City	Freight Pass.	New York	Cristobal, Balboa, Salaverry, Callao, Pisco, Mollendo, Arica, Iquique, Antofagasta, Coquimbo, Valparaiso
			New York	Buenaventura, Guayaquil, Cartagena occasionally, Peruvian and Chilean ports
82	Panama Mail Line Panama Mail S.S. Co. 2 Pine St. San Francisco, Calif.	Freight Pass.	New York to Los Angeles, San Francisco	Puerto Colombia, Cartagena, Canal Zone, Punta Arenas, Corinto, La Libertad, La Union, Acajutla, San Jose, Champerico, Mazatlan, San Jose del Cabo, Havana when east bound
			San Francisco, Los Angeles	Mazatlan, Manzanillo, Acapulco, Puerto Angel, Champerico, San Jose Acajutla, La Libertad, La Union, Amapala, Corinto, San Juan del Sur, Punta Arenas, Balboa, Cristobal
83	Western Line Western Ocean S.S. Corp. 30 Broad St. New York City	Freight & Ltd. Pass.	New York	Saint Thomas, Saint Croix, Saint Kitts, Antigua, Gaudeloupe, Dominica, Martinique, Saint Lucia, Barbados, Grenada, Saint Vincent, Trinidad, Demarara, Paramaribo

A Billion Dollar Business

THE accompanying world map, showing the American flag services in the foreign and noncontiguous trades, illustrates the progress made in the past decade in reëstablishing ourselves upon the seas.

With the magnificent ships now under construction and projected as a result of the Merchant Marine Act of 1928, many of these services will be greatly strengthened and better able to meet the keen competition now existing in the world's trade routes.

The water-borne transportation of the foreign trade of the United States has reached huge proportions. Last year about 5,200 vessels of over 24,500,000 gross tons made a total of over 60,000 entrances and clearances. These vessels transported more than 2,000,000 passengers and in excess of 111,000,000 long tons of cargo. The total passenger and cargo revenues amounted to $1,000,000,000.

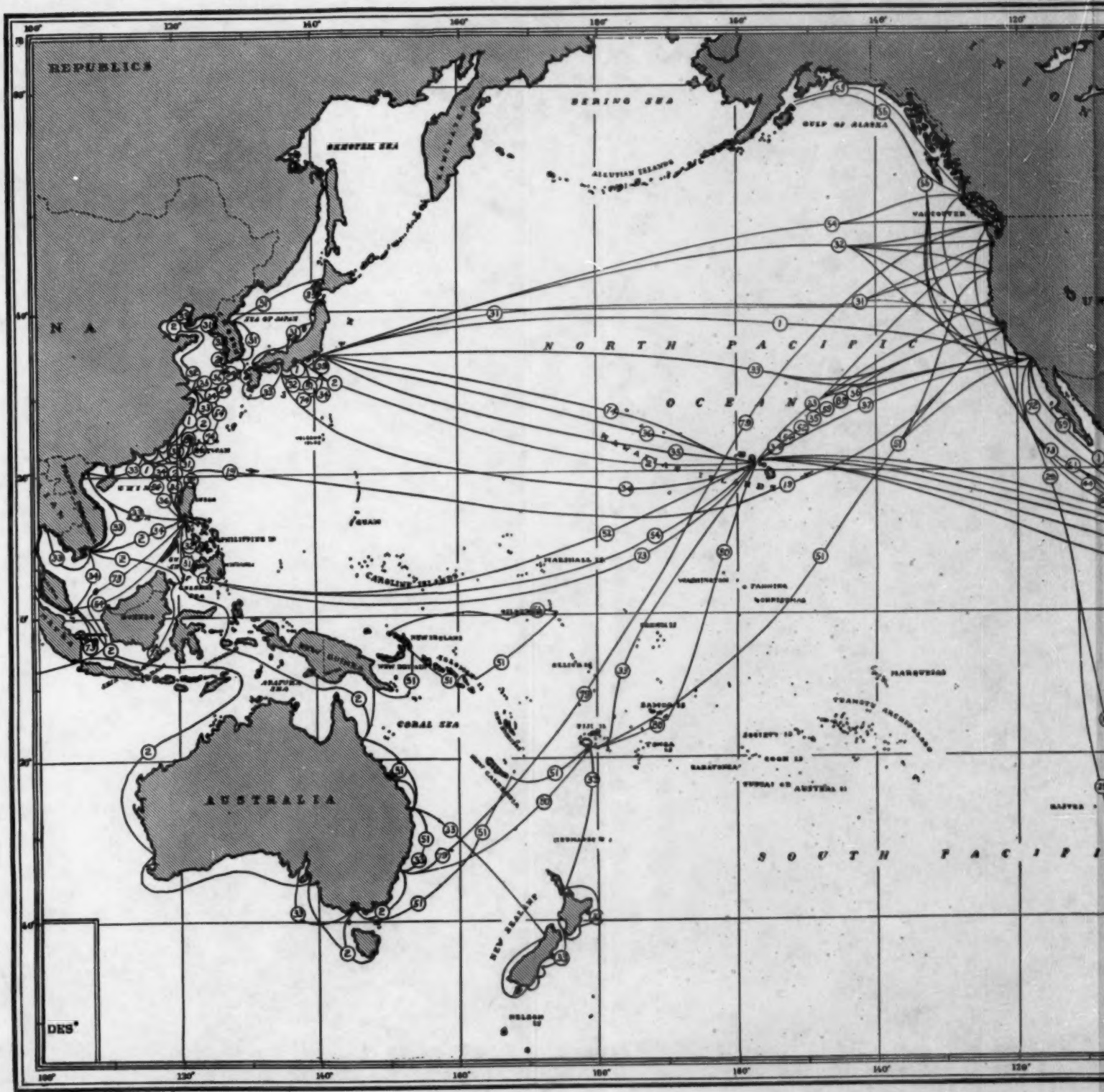
Vessels flying the flags of thirty countries participated in the transportation of our foreign trade. It is worthy of note that the average carried in American ships during the past decade was over 35 per cent. This shows a substantial increase over the decade prior to 1914 when it averaged 10 per cent. The gain in carriage is the more significant in view of the fact that the average annual value of the commerce for the past ten years carried in American ships was $2,600,000,000 as against the ten year average prior to 1914 when it was $300,000,000.

We have learned from the costly lessons of the past that it is unsound economics to permit our competitors to control the transportation of our foreign commerce. As a safeguard to our naval, military, and commercial interests we must have a sufficient number of merchant ships to carry the bulk of our foreign commerce at all times.

The American people are again becoming sea-minded, with a full realization that their economic stability, industrial and political independence as well as their security are, in a large measure, dependent upon an adequate merchant marine.

AMERICAN FLAG SERVICES IN FO

AS OF

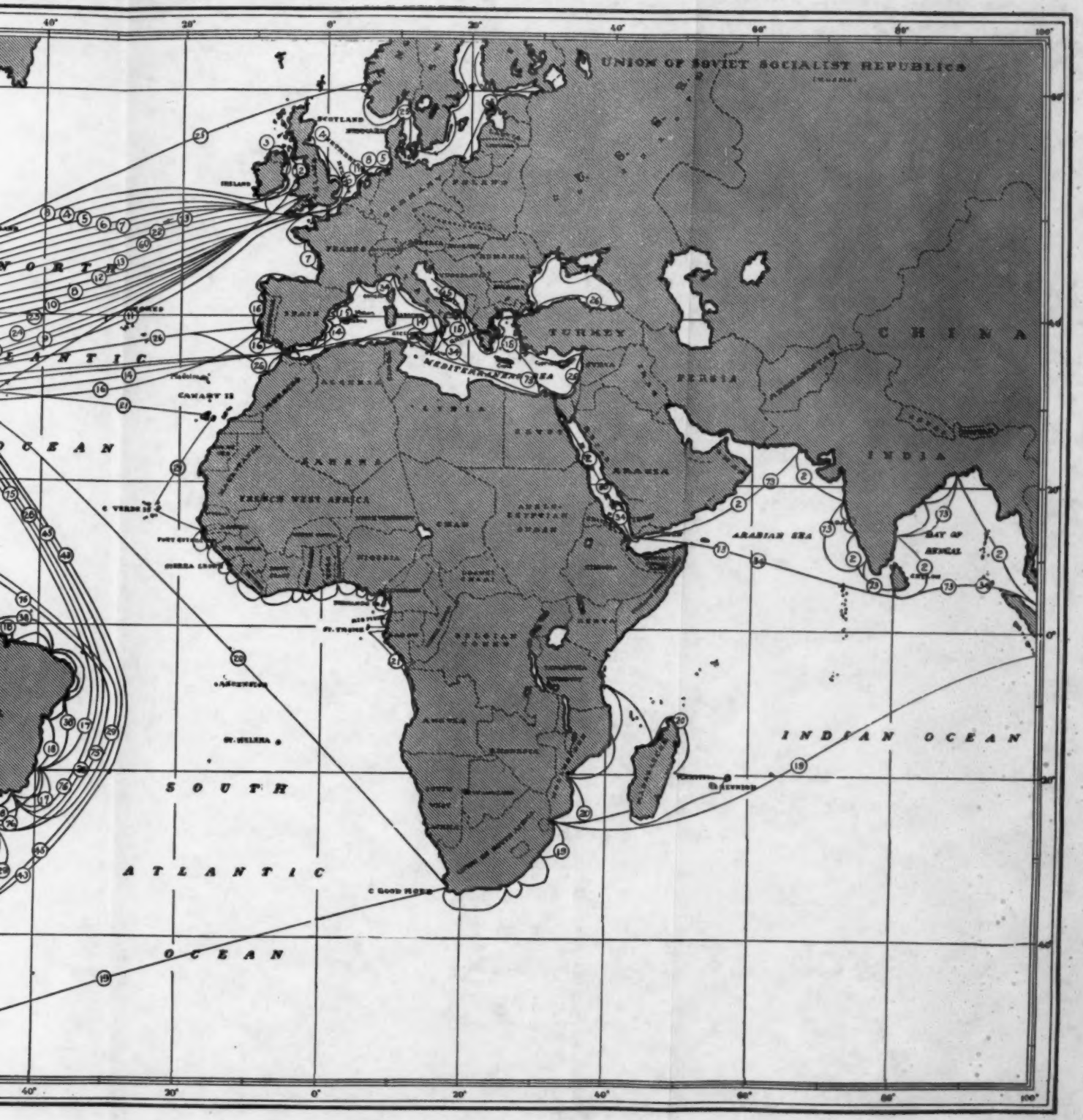


* Does not include tanker services.

AG SERVICES IN FOREIGN AND NONCONTIGUO

AS OF JANUARY 1, 1930

TIGUOUS TRADES*



Merchant-Ship Tonnage *of the* Five Principal Powers

Based upon statistical data supplied by The United States Shipping Board

MERCHANT-SHIP tonnage may be grouped under four broad classifications, viz:

(a) General cargo carriers.
(b) Passenger and combination carriers.
(c) Tankers.
(d) Vessels having refrigeration.

The general cargo carriers, which are the very backbone of the world's sea-borne commerce, head the list. The total tonnage of each of the foregoing classifications comprising the merchant marines of the five principal maritime powers, as of January 1, 1930, is shown in the table below, the combined tonnage of the five powers amounting to 36,152,825 tons.

The tabulation below obtained from the research bureau of the United States Shipping Board, shows that Great Britain's ocean-going merchant tonnage is nearly twice that of the United States, or expressed in percentage, the tonnage of the five powers is approximately as follows: Great Britain, 50 per cent; United States, 26.4 per cent; Japan, 8.3 per cent; Italy, 7.8 per cent; France, 7.5 per cent.

Merchant Vessels Available as Cruisers or Armed Transports

The following tabulation represents the number of vessels having an individual gross tonnage of 4,000 tons and above, with speed of fifteen knots, which in the event of hostilities might be utilized by the various powers as cruisers or armed transports:

Nation	Number of vessels	Nation	Number of vessels
United States..	79	France.....	42
Great Britain..	250	Italy.....	27
Japan.....	26		

The table shows that the merchant vessels of potential value as cruisers and armed transports is in the ratio of over 3 to 1 in favor of Great Britain, as compared with the United States.

[2,000 gross tons and over]

Class	United States		Great Britain		Japan		Italy		France	
	Number of ships	Tons	Number of ships	Tons	Number of ships	Tons	Number of ships	Tons	Number of ships	Tons
General cargo.....	1,176	5,884,822	2,075	10,116,624	469	2,119,334	358	1,675,181	333	1,303,374
Passenger and combination.....	166	1,285,437	470	4,732,853	141	806,284	113	830,705	163	1,253,455
Tankers.....	341	2,293,284	369	2,285,845	14	96,719	49	245,839	29	169,725
Vessels having refrigeration.....	12	62,565	120	921,914	.....	.....	11	62,023	2	6,842
Grand total.....	1,695	9,526,108	3,034	18,057,236	624	3,022,337	531	2,813,748	527	2,733,396

Included in the tabulation below are the following merchant vessels—formidable potential cruisers—having a displacement of over 20,000 tons, and speeds as shown in parentheses:

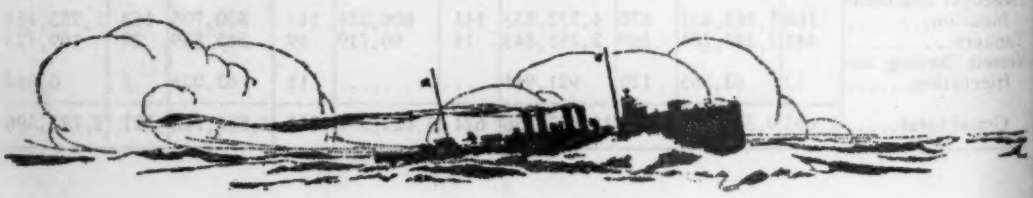
MERCHANT SHIPS OVER 20,000 TONS

Year built	United States	Great Britain	Japan	France	Italy
1903		Cedric (17)			
1904		Baltic (17)			
1905	America (17)	Empress of Scotland (17)			
1906		Adriatic (18)			
1907		Mauretania (25)			
1908	George Washington (18).				
1911		Olympic (22)			
1912		Berengaria (23)		France (20)	
1914	Leviathan (23)	Aquitania (23), Empress of Australia (18).			
1917		Belgenland (17)			
1921		Majestic (25)		Paris (21)	Giulio Cesare (19).
1922		Empress of Canada (20), Homeric (20).			
1923		Minnewaska (16), Mooltan (16), Maloja (16), Franconia (16).			Duilio (21).
1924		Minnetonka (16), Otranto (20).			Conte Biancamano (20).
1925		Asturias (17), Carinthia (16).			
1926		Carnavon Castle (18), Alcantara (17).		Ile de France (23)	Roma (21).
1927	California (18)				Saturnia (19), Augustus (19).
1928	Virginia (19)	Duchess of Richmond (18), Duchess of Bedford (17), Duchess of Atholl (17).			Conte Grande (21), Vulcania (19).
1929	Pennsylvania (18)	Duchess of York (18)		Lafayette (18)	
1930		Empress of Japan (21) Britannic (17)			
Total	6	29	0	4	8

In addition to the above Great Britain has the following ships building:

Oceanic (60,000 tons), has not been launched; work suspended.

Empress of Britain (40,000 tons), launched June 11, 1930.

Warwick Castle (20,000 tons), launched April 29, 1930.

Winchester Castle (20,000 tons), launched November 19, 1929.